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bulletin of
Duke University
1994-95

Undergraduate Instruction



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The Bulletin of Duke University, Volume 66, includes the following titles: *The Fuqua School of Business*; *The School of the Environment*; *Undergraduate Instruction*; *The Graduate School*; *The Medical Center*; *The Divinity School*; *Information for Prospective Students*; *Information for Graduate Studies*; *Summer Session*; *Graduate Program in Nursing*; *The School of Law*; and *Information and Regulations*.

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University Calendar—1994-95

Summer 1994*

- March**
23 Wednesday—Registration begins for Term I and/or Term II
- May**
4 Wednesday—Last day for registration and payment of Term I fees without \$25 late fee (before 4:00 P.M.)
12 Thursday—Term I classes begin
16 Monday—Drop/Add for Term I ends at 4:00 P.M.
- June**
17 Friday—Last day for registration and payment of Term II fees without \$25 late fee (before 4:00 P.M.)
20 Monday—Term I classes end
21 Tuesday—Reading period
22 Wednesday—Term I final examinations begin
23 Thursday—Term I final examinations end
27 Monday—Term II classes begin
29 Wednesday—Drop/Add for Term II ends at 4:00 P.M.
- August**
3 Wednesday—Term II classes end
4 Thursday—Reading period
5 Friday—Term II final examinations begin
6 Saturday—Term II final examinations end

Fall 1994

- August**
25 Thursday—Orientation begins; assemblies for all new undergraduate students
29 Monday, 8:00 A.M.—Fall semester classes begin
- September**
5 Monday—Labor Day, classes in session
9 Friday—Drop/Add ends
- October**
14 Friday—Last day for reporting midsemester grades
14 Friday, 7:00 P.M.—Fall break begins
19 Wednesday, 8:00 A.M.—Classes resume
26 Wednesday—Registration begins for spring semester, 1995
- November**
4-6 Friday-Sunday—Parents' Weekend
13 Sunday—Registration ends for spring semester, 1995
14 Monday—Drop/Add begins
18-20 Friday-Sunday—Homecoming
23 Wednesday, 12:40 P.M.—Thanksgiving recess begins
28 Monday, 8:00 A.M.—Classes resume
- December**
8 Thursday, 7:00 P.M.—Fall semester classes end
9-11 Friday-Sunday—Reading period
11 Sunday—Founders' Day
12 Monday, 9:00 A.M.—Final examinations begin
17 Saturday, 10:00 P.M.—Final examinations end

*The School of the Environment, the Fuqua School of Business, the Marine Laboratory, the Graduate Nursing Program, and Physical Therapy may have different starting dates during the summer; consult the appropriate bulletins and schedules.

Spring 1995

January

- 11 Wednesday—Registration and matriculation of new undergraduate students
- 12 Thursday, 8:00 A.M.—Spring semester classes begin
- 25 Wednesday—Drop / Add ends

February

- 24 Friday—Last day for reporting midsemester grades

March

- 10 Friday, 7:00 P.M.—Spring recess begins
- 20 Monday, 8:00 A.M.—Classes resume
- 29 Wednesday—Registration begins for fall semester, 1995, and summer, 1995

April

- 13 Thursday—Registration ends for fall semester, 1995; summer registration continues
- 14 Friday—Drop / Add begins
- 26 Wednesday, 7:00 P.M.—Spring semester classes end
- 27-30 Thursday-Sunday—Reading period

May

- 1 Monday, 9:00 A.M.—Final examinations begin
- 6 Saturday, 10:00 P.M.—Final examinations end
- 12 Friday—Commencement begins
- 14 Sunday—Graduation exercises. Conferring of degrees



University Administration

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General Information



Duke University

In 1839 a group of citizens from Randolph and adjacent counties in North Carolina assembled in a log schoolhouse to organize support for a local academy founded a few months earlier by Brantley York. Prompted, they said, by "no small share of philanthropy and patriotism," they espoused their belief that "ignorance and error are the banes not only of religious but also civil society which rear up an almost impregnable wall between man and happiness." The Union Institute, which they then founded, was reorganized in 1851 as Normal College to train teachers, and again in 1859 as Trinity College, a liberal arts college, which later moved from the fields of Randolph County to the growing city of Durham, North Carolina. Trinity College was selected by James B. Duke as the major recipient of a fortune when, in 1924, he provided endowment funds for the university that would be organized around Trinity College and named for the Duke family.

The old Trinity College had, like almost all institutions in America at the time it was founded, been restricted to men. In 1896, Washington Duke gave an endowment with the condition that women be admitted "on equal footing with men." Thereafter, women were educated in Trinity College, and in 1930 the Woman's College was established as a separate college. Trinity College and the Woman's College continued as coordinate colleges for over forty years. To assure that women were indeed admitted "on equal footing with men," and to recognize that the education which men and women had received at Duke had long taken place in the same classrooms, the University merged these coordinate colleges in 1972 to form Trinity College of Arts and Sciences, the liberal arts undergraduate college of the University. The Bachelor of Arts and Bachelor of Science degrees may be earned in the college.

Instruction in engineering started at Normal College in 1851 and was continued at Trinity College as an option in the arts and sciences program. A Department of Engineering was established at Trinity in 1910. Following the establishment of Duke University in 1924, the Departments of Civil and Electrical Engineering were formed in 1927, and a Department of Mechanical Engineering was added four years later. The three engineering departments were joined to form the Division of Engineering as a separate administrative unit of the University. In 1939 this division was renamed the College of Engineering, which in 1966 became a professional school of engineering. The Division of Biomedical Engineering was added to the School of Engineering in 1967, and it was recognized as a department in 1971. In 1974 the name of the mechanical engineering department was changed to the Department of Mechanical Engineering and Materials Science; in 1982, the Department of Civil Engineering was renamed the Department of

Civil and Environmental Engineering. All four departments offer courses leading to Bachelor of Science in Engineering, Master of Science, and Doctor of Philosophy degrees.

The School of Nursing was established in 1931 in association with the School of Medicine and Duke Hospital. From 1944 until 1984, the Bachelor of Science in Nursing Education degree was offered. In 1980, the University Board of Trustees approved the phaseout of the existing undergraduate degree programs. At present, the School of Nursing offers courses leading to the Master of Science in Nursing degree, a program initiated in 1958.

As the university developed around the core of undergraduate colleges and schools, the Graduate School, organized in the 1920s, expanded in areas of instruction and research. It now consists of some fifty-five departments and programs and offers A.M., M.S., M.A.T., M.P.P., and Ph.D. degrees. In 1930, the School of Law of Trinity College was established as a graduate professional school, the Duke University School of Law, and was followed by other professional schools. The Divinity School was organized in 1926 and the School of Medicine in 1930. The School of Forestry which began in 1938 grew into the School of Forestry and Environmental Studies in 1974, and was restructured to become the School of the Environment in 1991. The Graduate School of Business Administration was established in 1969 and renamed the Fuqua School of Business in 1980.

Duke, a privately supported, church-related (Methodist) university, has over 10,000 students enrolled in degree programs. These students represent nearly every state and many foreign countries; Duke has more than 85,000 alumni in all fifty states and in numerous foreign countries. The university is a member of the North Carolina Association of Independent Colleges and Universities, the Southern Association of Colleges and Schools, and the Association of American Universities.

From academy to university, some of the basic principles have remained constant. The Duke University motto, *Eruditio et Religio*, reflects a fundamental faith in the union of knowledge and religion, the advancement of learning, the defense of scholarship, the love of freedom and truth, a spirit of tolerance, and a rendering of the greatest service to the individual, the state, the nation, and the church. Through changing generations of students, the objective has been to encourage individuals to achieve, to the extent of their capacities, an understanding and appreciation of the world in which they live, their relationship to it, their opportunities, and their responsibilities.

Resources of the University

The Faculty. The university faculty, numbering approximately 1,900, maintains a tradition of personal attention to students and devotion to research. Many members of the faculty are, and have been, cited for excellence in teaching and are elected to membership in the national societies which honor those best in scholarship and research. Leaders in their disciplines and their professional organizations, they are authors of significant books and articles. Members of the faculty also act as consultants to industry, government, and foundations. To honor its outstanding faculty, the University has established more than one hundred James B. Duke and other named professorships.

The Library System. The libraries of the university consist of the William R. Perkins Library and its seven branches on campus: Biology-Forestry, Chemistry, Lilly, Engineering, Music, Mathematics-Physics, Special Collections; the Pearse Memorial Library at the Duke Marine Laboratory in Beaufort; and the independently administered libraries of Divinity, Law, Medicine, and Business (Fuqua). As of June 1993, these libraries contained over 4,200,000 volumes. The collection includes 9.5 million manuscripts, and over 2,000,000 public documents.

The William R. Perkins Library. The William R. Perkins Library, the main library of the university, houses books, journals, and online resources supporting the humanities and the social sciences, as well as a large collection of United States federal and state

documents and public documents of many European and Latin American countries. The library is a depository for U.S., North Carolina, and European Community documents. An international focus is evident throughout the library collections, reflecting the global and interdisciplinary directions of scholarship and teaching as well as the historical strengths of area programs at the university. Included are extensive research collections from and about South Asia, Latin America, Africa, Europe, Russia, and Poland, as well as the country's largest collection of Canadiana. The East Asian Collection offers resources in Japanese, Chinese, and Korean on a variety of topics, predominantly history, politics, literature, and language. The newspaper collection includes many eighteenth-century titles; strong holdings of nineteenth-century New England papers; and antebellum and Civil War papers from North Carolina, South Carolina, Virginia, and Georgia; as well as many European and Latin American papers.

The Special Collections Library holdings range from ancient papyri to records of modern advertising. They number more than 150,000 printed volumes and more than 9.5 million items in manuscript and archival collections. They support research in a wide variety of disciplines and programs, including African-American studies, anthropology, classics, economics, history, literature, political science, religion, sociology, and women's studies. Areas of particular strength in the collections include the history and culture of the American South, English and American literature, history of economic theory, British and American Methodism, and the history of modern advertising.

The Circulation/Reserves Department houses the required reading materials placed on reserve for most graduate and undergraduate courses. The department is phasing in campus online access to reserve readings. The Lilly Library houses the university's principal collections of the visual arts and art history, drama, and philosophy. The Lilly Library is also the location of the Paul B. Williams Multimedia Broadcast Center. This state-of-the-art facility features remote transmission facilities for the campus as well as the film and videocassette collection. The branch libraries serve the academic disciplines bearing their names, as well as provide access to online resources available through the online catalog.

The Music Library, located in Room 113 of the Mary Duke Biddle Music Building, and the Music Media Center, located in Room 027 of the same building, are administered as a single branch library within the Perkins Library system. The Music Library contains a rapidly expanding collection of scholarly reference materials, books on music, music scores, and over 200 journals in the field. The Music Media Center has a collection of over 17,000 media items, including compact discs, cassettes, LP recordings, laser discs, and videotapes, plus a collection of over 10,000 microforms, along with various facilities for listening and viewing.

The libraries at Duke, the University of North Carolina at Chapel Hill, and North Carolina State University are connected by a computer network. Members of the Duke community can easily and quickly determine what books and other library materials are held by UNC and NCSU. Through a reciprocal borrowing agreement, faculty and students at Duke may borrow materials from both of these libraries.

Reference librarians are on duty in Perkins Library for most of the hours the library is open. Their primary responsibility is to assist patrons in making the most effective use of information resources including library collections and facilities. In addition to answering specific questions, the reference librarians also help patrons access information by identifying and explaining the use of library sources and by giving formal and informal instruction to groups of students, faculty, or staff. Professional reference service is available to students in all other campus libraries.

Tours of the Perkins Library are given frequently during Orientation Week and upon request throughout the year. Information about other campus libraries may be obtained from the staff in each of the libraries. Handbooks about library services and facilities are also available in each of the libraries.

The library has both facsimile and copying services. The rules with regard to copyright and a schedule of fees for reproduction services are available in the library at the point of service.

The Medical Center Library. The Medical Center Library, located in the Seeley G. Mudd Communications Center and Library Building, provides the services and collections necessary to further educational, research, and clinical activities in the medical field. Services are available to the students, faculty, and staff of the School of Medicine; of the Division of Allied Health; of Duke Hospital; and of the graduate departments in the basic medical sciences. Other students and faculty needing access to biomedical literature may apply for privileges upon application to the head of the Circulation Department.

Over 270,000 volumes are available, including the Trent Collection in the History of Medicine. Approximately 2,700 journal subscriptions are received currently, in addition to extensive back files of older materials. The library has several types of audiovisual materials and equipment. With the exception of certain items shelved on reserve, these materials have been shelved after the general book collection or integrated into the journal collection and are listed in the online catalog. The Frank Engel Memorial Collection consists of a small group of books on nonmedical subjects for general reading, together with several newspapers and popular magazines. Traditional reference services are supplemented by on-line bibliographic systems and computer-produced specialized indexes. Photocopy service is available to eligible students, faculty, and staff. Copyright information and a schedule of fees are available in the library at the point of service.

The uniform borrowing privileges apply to all registered users. Details of loan and other services may be found in the guide which is published each year and is available at the library.

The School of Law Library. The School of Law Library, with over 450,000 volumes, serves both the university and the local legal community. It features comprehensive coverage of basic Anglo-American primary source materials, including nearly all reported decisions of federal and state courts, as well as current and retrospective collections of federal and state codes and session laws. Digests, legal encyclopedias, and other indexing devices provide access to the primary documents. A large section of the library collection is devoted to treatises on all phases of law, as well as history, economics, government, and other social and behavioral sciences relevant to legal research. The treatises are organized in the Library of Congress classification system and most are accessible through the Duke University online catalog. Special treatise collections are maintained in several subject areas, including the George C. Christie collection in jurisprudence and the Floyd S. Riddick collection of autographed senatorial material. The library is a selective depository for United States government publications, with concentration on congressional and administrative law materials. The library receives the records and briefs from the United States Supreme Court, the Fourth Circuit Court of Appeals, and the North Carolina Supreme Court and Court of Appeals. In addition to its Anglo-American holdings, the library holds substantial research collections in foreign and international law. The foreign law collection is extensive in coverage, with concentrations in European law and business law materials. The international law collection is strong in primary source and treatise material on both private and public international law topics. Undergraduate and graduate students whose course of study requires access to legal literature may use the library. However, access to the library may be restricted during certain times because of accreditation standards.

University Archives. The Duke University Archives, the official archival agency of the university, collects, preserves, and administers the records of the University having continuing administrative or historical value. The institutional archives, which also include published material, photographs, papers of student groups and faculty, and selected memorabilia, are available for research under controlled conditions in 341 Perkins Library.

Computer ASSIST Center. For a contemporary university, extensive computing resources are essential. At Duke, the Computer ASSIST Center is the organization that works in partnership with members of the university community to enable them to achieve their goals through computing.

The Computer Assist Center supports extensive personal computer and Unix workstation services located throughout the campus. There are six Unix workstation laboratories and clusters containing DEC computers, located in the North, Sociology-Psychology, Biological Sciences, Carr, and Engineering buildings. These workstations are connected to two DEC compute servers and six file servers. There are three laboratories of MS-DOS based computers housed in North, Perkins, and West Duke buildings, five other clusters of MS-DOS computers, and nine clusters of Macintosh computers spread throughout the campus. All clusters have dot matrix or laser printers and several are connected to the campus network (DukeNet). While there is a slight charge for use of the laser printers, there is no charge for use of the computers. Free e-mail accounts are available for students from Computer ASSIST.

DukeNet is a fiber optics, backbone network, available in most campus buildings, that provides access to the DEC Unix System, to the Perkins Library online catalog, and to other computing resources, both at Duke, and nationwide over the Internet network. DukeNet is managed by Network Communications (NetComm) at Duke. Many undergraduate dormitory rooms are now wired for DukeNet. DukeNet access is also provided by dialing into a terminal server from a PC with a modem.

Other computing facilities available include mainframe services on an IBM ES/9000 provided by the Duke University Computation Center (DUCC) and supercomputing services on a Cray Y-MP and a Kendall Square KSR-1 parallel computer provided by the North Carolina Supercomputing Center (NCSC).

More specific information regarding Duke computing facilities may be obtained by calling the Computer ASSIST Center Consulting Desk at 660-2983, 9:00 A.M. to 5:00 P.M., Monday through Friday.

Science Laboratories. In addition to the teaching and research laboratories in the departments of natural and social sciences and in the School of Engineering, there are other facilities in which some advanced undergraduates work on individual projects. These include the Duke University Marine Laboratory in Beaufort, North Carolina; the Phytotron of the Southeastern Plant Environment Laboratories, located on the Duke campus; the Duke Forest, adjacent to the campus; the Duke University Primate Center in Duke Forest; the Triangle Universities Nuclear Laboratory; and the Free Electron Laser Laboratory, also on campus. The Levine Science Research Center, which opened spring 1994, houses 202,157 net square feet consisting of laboratories, office and classroom space for interdisciplinary science research, state-of-the-art teaching laboratories, and shared instrumentation facilities.

Duke as a Residential University

Duke has a long tradition as a residential university and has sought to provide for the great majority of the undergraduates convenient on-campus housing in both residence halls and apartments. While the university was established to provide a formal educational opportunity for students, Duke has always taken the position that education encompasses social and personal development as well as intellectual growth. In order to facilitate such a holistic approach, Duke seeks to provide a supportive environment substantially anchored in its residential program.

Educational, cultural, and outdoor adventure programming is planned and presented throughout the year for living groups through the cooperative work of the Office of Student Development, Trinity College of Arts and Sciences, the School of Engineering, and resident students. There are a number of faculty members who live in residence halls. Faculty offices and seminar rooms are also located in several houses. The goals of

these various programs are to enhance the quality of intellectual and social life for the residents on campus, to facilitate student-faculty interaction outside of the formal classroom, and to develop a greater sense of community within the individual residence halls as well as within the greater university.

The Undergraduate College and School

In Trinity College of Arts and Sciences and the School of Engineering, instruction is offered by university faculty who engage in research and in graduate and undergraduate teaching. Duke offers its undergraduates the opportunity to study with many internationally recognized experts in their disciplines and with faculty members who are jointly committed to undergraduate instruction and to the advancement of knowledge. The university recognizes that students learn not only through formal lectures, but also through the interplay of ideas among faculty members and students; thus, it offers undergraduates opportunities to test their ideas against those of their professors and to observe at close range those who have committed their lives to academic careers.

The university, if it is doing its job properly, is educating citizens of the United States and of the world, not only individuals aspiring to personal fulfillment. At Duke, the men and women who earn degrees are likely to become leaders in industry, government, and the professions. They will have influence on and will be influenced by the social fabric of which they are a part. The kind of people they become will matter not only to them and their families, but also to their communities, to the United States, and to the countries of the rest of the world as well.

Amidst changing external conditions, the university must ensure that students acquire the tools and flexibility to prepare them for life-long learning activities.

Trinity College of Arts and Sciences. In Trinity College, the liberal arts are a means through which students explore the world of ideas from art and music to neurosciences and physics. The undergraduate program, rated one of the finest in the country, helps students learn how to deal successfully with the challenges, intellectual and philosophical, that modern life provides. Trinity College is a community of outstanding students and talented, nationally-ranked faculty. As members of this community, students learn to ask questions, analyze rationally, challenge ideas, and contribute to the continuing development of knowledge.

The Trinity experience offers a traditional liberal arts base of study and currently offers, within broad limits, exposure to great ideas in six major areas: arts and literatures, civilizations, foreign languages, quantitative reasoning, natural sciences, and social sciences. It offers exposure across a broad spectrum as well, and interdisciplinary and interdepartmental programs stretch horizons even further. Internships and apprenticeships in areas related to students' majors are increasingly available so that practical experience can complement a more formal education. In a world where people are drawn ever closer together, the understanding of cultural difference and diversity becomes increasingly important. Our study abroad programs are varied and plentiful.

The undergraduate college of arts and sciences is unique in that it is set within a distinguished research university. We believe that this combination provides unparalleled opportunities for interaction with faculty, both inside and outside the classroom. The arts and sciences faculty boasts some of the most highly rated scholar-teachers in the country. They challenge students both to master and to reach beyond the basics of fundamental knowledge. At Duke there is a genuine concern for learning, and students are prepared by academic challenges and their individual experiences for the critical decision-making required of them for participatory citizenship, full personal lives, and successful careers.

School of Engineering. The undergraduate engineering program at Duke University is designed both for students who intend to become professional engineers and for those who desire a modern, general education based on the problems and the promises

of a technological society. The environment in which students are educated is as important in shaping their future as their classroom experiences. In the Duke School of Engineering this environment has two major components: one is modern technology derived from the research and design activities of faculty and students in the school; the other is the liberal arts environment of the total university, with its humanitarian, social, and scientific emphases.

Engineering is not a homogeneous discipline; it requires many special talents. Some faculty members in the School of Engineering are designers; they are goal-oriented, concerned with teaching students how to solve problems—how to synthesize relevant information and ideas and apply them in a creative, feasible design. Other engineering faculty members function more typically as scientists; they are method-oriented, using the techniques of their discipline in their teaching and research to investigate various natural and artificial phenomena.

Degree Programs



Degrees and Academic Credit

Duke University offers in Trinity College of Arts and Sciences the degrees of Bachelor of Arts and Bachelor of Science, and in the School of Engineering the degree of Bachelor of Science in Engineering. Within the curriculum of each college or school, students have the major responsibility for designing and maintaining a course program appropriate to their background and goals. They are assisted by faculty advisors, departmental directors of undergraduate studies, and academic deans.

Credit toward a degree is earned in units called semester courses (s.c.), commonly abbreviated as courses. These courses ordinarily consist of three to four hours of instruction each week of the fall or spring semester or the equivalent total number of hours in a summer term. Double courses, half courses, and quarter courses are also recognized.

Trinity College of Arts and Sciences

A variety of approaches to a liberal education is provided by Program I and II. Either program leads to the Bachelor of Arts or Bachelor of Science degree, and each requires thirty-four semester courses.

PROGRAM I

Program I provides for the experience and achievement that constitute a liberal education. The ability to organize ideas and to communicate them with clarity and precision is refined by completing the writing course and by the requirement for discussion in small groups. Knowledge of a foreign language contributes to an understanding of the nature of language itself and to perspectives on other cultures. Through courses in arts and literatures students learn about the creative products of the human intellect; courses about civilizations ask students to attend to the analysis and evaluation of ideas and events that shape civilizations past and present. Through courses in natural sciences students learn how to interpret and utilize information in an increasingly technological world, while courses in quantitative reasoning help develop skills of inference and analysis. Finally, through courses in the social sciences students learn about the causes of human behavior and about the origins and functions of the social structures in which we operate.

Students must complete the requirements listed below and explained, where necessary, on the following pages. No degree requirements, except the requirement for

thirty-four course credits and continuation requirements, may be met by a course passed under a pass/fail option unless the course is offered only on that basis.

Students must accept personal responsibility for understanding and meeting the requirements of the curriculum.

Writing. Students are required to demonstrate ability to write effective English prose by completing a course in expository writing, ordinarily University Writing Course 4, 5, 6, 7, or 8. See the section University Writing Program in the chapter "Courses of Instruction."

General Studies consisting of courses in five of the following six areas of knowledge:

Arts and Literatures (AL)
Civilizations (CZ)
Foreign Languages (FL)
Natural Sciences (NS)
Quantitative Reasoning (QR)
Social Sciences (SS).

- In four of these areas a student must take three courses; at least one of the three in each area must be at the 100-level.
- In the remaining area a student must take two courses.
- Advanced placement credits will *not* substitute for courses in these areas.
- Courses counting toward requirements in a major (and additional courses taken in the major department) do not count toward more than two of these areas.

The Major consists of the requirements for majors in the department or program in which a student wishes to obtain a bachelor's degree (see below). These requirements are described under the course listing for each department or program. Advanced placement courses may substitute for courses in the major as described by each department.

Elective courses. Advanced placement credits may function as elective courses. Courses that a student is using as electives may or may not carry an area of knowledge designation.

Small Group Learning Experiences.

- Before reaching junior status: at least one full course designated as a seminar, tutorial, or independent study; or a combination of two preceptorials or discussion sections.
- During the junior and senior years: at least two full courses designated as seminars, tutorials, independent study, or a thesis.

Course credits. There are several separate and specific requirements concerning course credits in Trinity College. Thirty-four (34) courses are required for graduation, not more than two with a grade of *D*, and including:

- At least seventeen (17) at Duke (including the senior year).
- At least twenty-one (21) outside the first major department.
- For any major (including courses that the major department or program requires outside itself): a department or program may require no more than seventeen (17) total for a Bachelor of Arts major and no more than nineteen (19) for a Bachelor of Science major.
- At least twelve (12) courses at or above the 100-level.
- No more than: one credit of physical education activity (i.e., two half-credit activity courses), four credits of dance/American Dance Festival technique/performance (i.e., eight half-credit courses), two credits for house courses (i.e., four half-credit house courses), six from a professional school (e.g., business, engineering, medicine), and four in military science.

Quality of Work. Passing grades are expected in all course work, but see pages below for minimum continuation requirements.

General Studies (Distribution of Courses). Students achieve breadth and balance of intellectual experience by taking courses in at least five of the six areas of knowledge. Courses that can be taken to satisfy the distribution requirement are identified in the bulletin by a two-letter code (AL, CZ, FL, NS, QR, SS). In four of the areas of knowledge a student must take at least three courses. At least one of the three courses must be at the 100 or 200 level. In one additional area of knowledge a student is required to take at least two courses. Courses counting toward requirements in a major (and additional courses taken in the major department) do not count toward more than two of these areas.

The Major. Students are expected to acquire some mastery of a particular discipline or interdisciplinary area as well as to achieve a breadth of intellectual experience. They therefore complete a departmental major, an interdisciplinary major, or an interdepartmental concentration. At least half the courses for a student's major field must be taken at Duke although departments may make exceptions to this rule in special circumstances. Students are responsible for meeting the requirements of a major as stated in the bulletin for the year in which they matriculated in Trinity College although students have the option of meeting requirements in the major changed subsequent to the students' matriculation. A student who completes requirements for two majors may have both recorded on the official record. See the chapter "Academic Procedures and Information" for the majors within each degree and for procedures on declaring a major.

Departmental Major. The courses for a departmental major may include introductory or basic prerequisite courses and higher-level courses in the major department or in the major department and related departments. The courses required in the major department must include at least five beyond the introductory or basic prerequisite level, but these required courses may not exceed eight semester-course credits for the Bachelor of Arts degree or ten for the Bachelor of Science degree. Furthermore, the total number of courses required at any level in the major and related departments may not exceed seventeen semester courses for the Bachelor of Arts degree and nineteen semester courses for the Bachelor of Science degree. Students may elect to take more courses in their major than are required, but only thirteen courses in one (the major) department count toward the graduation requirement of thirty-four semester courses. Departmental majors are available in art history, biological anthropology and anatomy, chemistry, classical languages, classical studies, computer science, cultural anthropology, economics, English, French studies, geology, Germanic languages and literature, history, Italian studies, mathematics, music, philosophy, physics, political science, psychology, public policy studies, religion, Slavic languages and literatures, sociology, Spanish, and visual arts. The courses required for a major are specified by the department. The requirements appear in the section following each department's course descriptions.

Program Major. Students may satisfy the requirement by completing work prescribed for a major in approved programs, often interdisciplinary. These programs include African and Afro-American studies, biology, Canadian studies, comparative area studies, drama, environmental science and policy, literature, medieval and Renaissance studies, and women's studies. The requirements for these majors appear under each program in the chapter "Courses of Instruction."

Interdepartmental Concentration. A student may pursue an interdepartmental major program designed by the student and advisors as an alternate means of satisfying the major requirement. An interdepartmental concentration consists of at least three courses beyond the introductory level (i.e., at the 100- or 200-level) in each of two or more Trinity College departments or programs that offer majors. For procedures see the section on declaration of major or division in the chapter "Academic Procedures and Information."

Small Group Learning Experiences. By supplementing the classroom and lecture methods of instruction, small group learning experience courses assure students opportunities to engage in discussion, develop skills, refine judgment, and defend ideas when challenged. A *seminar* (ordinarily indicated by the suffix *S*) is an independent course of twelve to fifteen (exceptionally to twenty) students who, together with an instructor, engage in disciplined discussion. The number of meeting hours per term is the same as for regular courses of equivalent credit. Instructors are encouraged to present to each student at the end of the term a written evaluation of the student's work. A *discussion section* (*D*) is a group of fifteen students (exceptionally to twenty) and an instructor, in which discussion is the paramount characteristic; it is an integral part of a larger regular course, and every member of the class is enrolled. A *preceptorial* (*P*) is a group of usually no more than twelve students and an instructor in which discussion is the primary component; it is an additional and optional unit attached to a regular course involving one or more extra meetings per week. No additional course credit is given for a preceptorial. A *tutorial* (*T*) is a group of one to five students and an instructor meeting for discussion which is independent of any other course. For *independent study* students pursue their own interests in reading, research, or writing, but meet with an instructor for guidance and discussion. See the section on independent study in the chapter "Academic Procedures and Information." Instructors in all courses that satisfy the requirements for small group learning experiences, including independent study, must meet with the students at least once every two weeks. The requirements for small group learning experiences are listed under Program I, above. Preceptorials, discussion sections, seminars, and tutorials may not be taken on the pass/fail basis, unless the course is offered only on that basis.

Course Requirements. Thirty-four semester courses are required for graduation, including a maximum of two courses passed with a grade of *D*. At least seventeen courses, including the work of the senior year, must be passed at Duke. Twelve courses must be at the advanced (100-200) level. The thirty-four course credits may include (1) no more than thirteen courses in one department; (2) no more than seventeen total for a major (including those required in related departments) under the Bachelor of Arts degree and no more than nineteen total for a major (including those required in related departments) under the Bachelor of Science degree; (3) no more than one semester-course credit in physical education activity courses; (4) no more than four semester-course credits in dance/American Dance Festival technique/performance courses (i.e., a total of eight half-credit courses); (5) no more than two credits for house courses; (6) no more than six credits for courses taken in professional schools; and (7) no more than four semester-course credits in military science. Certain military science courses listed as carrying credit do not count toward graduation but appear on a student's permanent academic record. Military science courses, like professional school and all physical education courses, do not satisfy general studies (area of knowledge) requirements. (American Dance Festival courses are included in the total limitation on dance technique/performance courses as noted above in this paragraph.)

Residence. A residence period of eight semesters is the typical amount of time a student may take to earn either the Bachelor of Arts or the Bachelor of Science degree. This period may be extended for one or two semesters by a student's academic dean for legitimate reasons, if it seems probable that an extension will enable the student to complete all remaining requirements for graduation. A student will not be permitted residence of more than ten semesters in order to be graduated.

For the minimum residence period, at least seventeen courses must be satisfactorily completed at Duke, including the courses needed to meet the senior year residence requirement. (For the purposes of the residence requirement, advanced placement credits are not considered as courses taken at Duke.) If only seventeen courses are taken at Duke, they must include the student's last eight courses. A student with more than

seventeen courses at Duke may take two of the last eight courses at another approved institution. A student who has completed twenty-six courses at Duke may take four of the last eight courses at another approved institution. Courses taken elsewhere must be approved in advance by the appropriate director of undergraduate studies and the student's academic dean.

Former students of Trinity College or the Woman's College who have been out of college for at least six years, and left in good standing, may, with certain provisos, take up to eight semester-courses in another institution of approved standing in final fulfillment of graduation requirements. Further information can be obtained from the associate dean of Trinity College of Arts and Sciences responsible for coordinating readmission.

Quality of Work (Continuation Requirements). A student must achieve a satisfactory record of academic performance each term and make satisfactory progress toward graduation each year to continue enrollment in college. A student who fails to meet the minimum requirements described below must leave college for at least two semesters; a summer session may be counted as a semester. The student may apply to Trinity College of Arts and Sciences for readmission. If, after readmission, the student again fails to meet continuation requirements, the student will be ineligible, except in extraordinary instances, for readmission to Trinity College. Students admitted to degree programs from Continuing Education should consult their academic deans concerning continuation requirements.

Satisfactory Performance Each Term. A student who does not receive a passing grade in all courses must meet the following minimum requirements or be withdrawn from the college.

In the Fall or Spring Semester: (1) in the first semester of enrollment at Duke, a student with a normal course load (of at least four semester courses, as defined in the chapter "Academic Procedures and Information") may not fail more than two full courses; (2) after the first semester at Duke, a student with four or more courses may not fail more than one full course; (3) a first-semester student, whether a freshman or a transfer student, who for a special reason has received permission from an academic dean to enroll in fewer than four courses may not fail more than one full course; (4) a student taking an authorized underload after the first semester at Duke must earn all passing grades. (Students may not carry an underload without the permission of their academic dean.) For the purposes of continuation, incomplete work in any course is considered a failure to achieve satisfactory performance in that course. Therefore, where continuation is in question, incomplete work in any course must be completed with a passing grade in time for final grades to be submitted to the Office of the Registrar no later than the weekday preceding the first day of classes of the spring semester, or prior to the first day of classes of the second term of the summer session, as appropriate. In the case of incomplete work in the spring semester, this requirement applies whether or not the student plans to attend one or more terms of the summer session. The student, however, may not enroll in a summer term at Duke unless the requirement of satisfactory performance each semester has been satisfied.

In the Summer Session: to maintain enrollment at Duke a student may not fail more than one full course in a summer term or a summer session. For purposes of continuation, incomplete work is considered failure to achieve a satisfactory performance in that course. Therefore, when eligibility to continue from the summer session to the fall is in question, incomplete courses must be satisfactorily completed in time for a passing grade to be submitted to the Office of the Registrar no later than the weekday preceding the first day of fall classes. Moreover, no student may enter the fall semester with more than one incomplete grade from the preceding spring and summer.

Any student excluded from the college under the provisions of these regulations may on request have the case reviewed by the senior associate dean of Trinity College of Arts and Sciences.

Satisfactory Progress toward Graduation. Each year prior to the beginning of fall term classes, a student must have made satisfactory progress toward fulfillment of curricular requirements to be eligible to continue in the college; i.e., a certain number of courses must have been passed at Duke according to the following schedule:

<u>To be eligible to continue to the</u>	<u>A student must have passed</u>
2nd semester at Duke	2 semester courses at Duke
3rd semester at Duke	6 semester courses at Duke
4th semester at Duke	10 semester courses at Duke
5th semester at Duke	14 semester courses at Duke
6th semester at Duke	19 semester courses at Duke
7th semester at Duke	22 semester courses at Duke, plus two additional courses*
8th semester at Duke	26 semester courses at Duke, plus two additional courses*

For students who have interrupted their university studies, the continuation requirement must still be satisfied before the beginning of each fall term. For such students, the number of courses needed to satisfy the continuation requirement is determined from the table above, based on which semester they will enter in the fall term.

Courses taken in the summer term at Duke may be used to meet this requirement; except as noted,* advanced placement may not be used to satisfy it. No more than two courses completed with *D* grades may be counted toward fulfilling this annual continuation requirement.

PROGRAM II

Nature and Purpose. Program II is an alternate approach leading to either the Bachelor of Arts or the Bachelor of Science degree. It offers the student who has an unusual interest or talent in a single field, or an unusual combination of interests or talents in several fields, an opportunity to plan and carry out a special curriculum adapted to these interests and needs. Students, with the assistance of a departmental Program II advisor, design an individual plan of study for the whole or the remainder of their college career. Advisor and student together assess the student's background, needs, and goals and evaluate the resources at the university or outside it as means of satisfying those goals. They consider what academic courses would be useful and also take into account that a term of independent study or work/study on or off campus, or a period of study abroad, might be appropriate. Each curriculum is tailored to the special interests and talents of the student for whom it is designed. Among the many topics for Program II have been American studies, primatology, dramatic literacy, linguistics, mariculture, modern thought, mass communications, Arabic studies, and bioethics.

Admission. Students interested in Program II should confer with the directors of undergraduate studies in the departments closest to their interests, with the dean responsible for Program II, and with the chair of the Committee on Program II, whose name may be obtained from 04 Allen Building. If the student seems eligible for Program II, the director or other departmental advisor, or an interdepartmental committee, will counsel the student concerning the design of the curriculum. When an interdepartmental committee is needed, one department will bear administrative responsibility. The curriculum must be approved by the department and also by the Committee on Program II of the Undergraduate Faculty Council of Arts and Sciences. Upon endorsement by that committee, the program becomes an obligation assumed by the student although

*The additional semester courses may be earned through advanced placement and/or transferred courses.

it may be modified later with the approval of the department and the Committee on Program II. Each semester the student's progress in achieving the plan is reviewed by the dean responsible for Program II.

Until formally accepted into Program II, a student should register for courses to satisfy the curricular requirements of Program I. Should Program II be dropped for any reason, the student assumes all requirements of Program I. Ordinarily, students will be accepted into Program II only after their first semester at Duke; they are ineligible for admission to Program II after their junior year. Further information about Program II may be obtained from the office of the academic dean responsible for Program II, in 04 Allen Building.

General Requirements. Apart from the requirements arising from the approved plan of work, a Program II student must satisfy certain general requirements: thirty-four semester-course credits for graduation; breadth requirements; the regulations on military science, house, professional school, and physical activity and dance courses; and residence, although the requirements relating to the last eight courses may be adjusted to suit the student's approved plan of work. Graduation with distinction and Latin honors by honors project are available for qualified students in Program II. See the section on honors in the chapter "Academic Procedures and Information."

COMBINATION PROGRAMS OF TRINITY COLLEGE AND DUKE PROFESSIONAL SCHOOLS

A student interested in attending a Duke professional school (business, environment, and law) may, upon meeting certain requirements, combine the senior year in Trinity College of Arts and Sciences with the first year in the professional school. To qualify the student must (1) successfully complete twenty-six semester courses in Trinity College; (2) fulfill all other degree requirements in Trinity College except for eight elective courses; (3) obtain the approval of the appropriate preprofessional advisor and academic dean in Trinity College; and (4) be admitted to the professional school. If the student's application to the professional school is accepted, the student transfers to the professional school for the fourth year and begins work on the professional degree. Upon successful completion of the work in the first year of the professional school, the baccalaureate degree is awarded to the student. The undergraduate record notes the student's enrollment in the combination program, the name of the professional school, the date of graduation from Trinity College, and the degree awarded, but it does not include courses taken in the professional school. Counseling and additional information are available from the preprofessional advisors.

PREPARATION FOR GRADUATE AND PROFESSIONAL SCHOOLS

Students planning to enter a graduate or professional school should consult their faculty advisors, director of undergraduate studies, or academic dean at the earliest opportunity. Since many graduate and professional schools require special tests for students seeking admission, information regarding requirements should also be obtained from the catalogs of the appropriate schools. The Office of Counseling and Psychological Services will provide applications for the testing programs.

Graduate Schools of Arts and Sciences. Students interested in obtaining a master of science, master of arts, or doctor of philosophy degree should discuss their plans as early as possible with faculty in the proposed field of advanced study. As undergraduates, they should become involved in research which may involve laboratory work, advanced seminars, or independent study. Many graduate schools require a reading knowledge of a foreign language. Information on this and other requirements is available in the bulletins of specific graduate programs and in the Directory of Graduate Programs published by the GRE board and Council of Graduate Schools. It may also be included in the "Handbook for Majors" for the major department. A research mentor, a

faculty advisor, and the Ph.D. advisor in the major department are the best resources for advice about graduate school in the arts and sciences. General advice may be sought from the advisor for pre-graduate study, 04 Allen Building.

Graduate Schools of Engineering. Students interested in graduate work in engineering should consult the dean of the School of Engineering or the director of graduate studies in one of the engineering departments. Most engineering graduate schools require that a candidate have the equivalent of a Bachelor of Science in Engineering degree; however, students in the natural and social sciences may obtain conditional admission if they have a sufficient background in mathematics.

Graduate Schools of Business. Students seeking information about graduate schools of business should consult the advisor in Trinity College. In preparing for graduate business school, students should gain a good liberal arts background, choosing courses that will help them develop communication skills, analytical skills, and an understanding of human nature. Students have often chosen such courses as Computer Science 10, Economics 1D and 2D (or 51 and 52), Management Sciences 53, and Mathematics 31 as those which develop analytical skills. For further information concerning undergraduate preparation, see the *Prebusiness Handbook for Duke Seniors and Alumni* and *The Official Guide to MBA Programs*, published by the Graduate Management Admission Council; these publications and other resource materials are available in the Prebusiness Advising Office, 03 Allen Building.

Medical and Dental Schools. Students planning to enter schools of medicine and dentistry can prepare for admission by completing any of the regular departmental majors in Program I or by completing Program II, and by taking those courses required by the professional schools of their choice. Virtually all medical schools and most schools of dentistry require the same basic group of college premedical courses—a year of biology, a year each of inorganic and organic chemistry, and a year of general physics. In addition, many schools require a year of English and courses in the humanities or social sciences. About a third of all medical schools require a year of college mathematics and some specify calculus, statistics, or computer science. For a complete listing of these and any additional course requirements set by each school, consult *Medical School Admissions Requirements*, published by the Association of American Medical Colleges or *Admission Requirements of U.S. and Canadian Dental Schools*, published by the American Association of Dental Schools. These and similar resources for schools of optometry and veterinary medicine are located in the Health Professions Advising Office. Students should discuss their programs of study with their major advisors, academic deans, and with the advisor for the health professions.

Graduate Programs in the Health Professions. Students interested in careers as physical therapists, health administrators, or others of the allied health professions should prepare with course work in the natural sciences and behavioral sciences within a liberal arts curriculum. Descriptive literature on each of the allied health schools and professions is part of the library maintained in the Health Professions Advising Office. Students will also find publications of selected advanced degree programs in biomedical research, including the combined M.D./Ph.D. degree programs.

Law Schools. Students who plan to prepare for law school and a career in law should seek breadth in their undergraduate course program with specialization in one or more areas. They may choose virtually any field for their major work. Though no specific courses are required, prelaw students have often chosen from among the following: Management Sciences 53; Economics 1D, 2D; English 117S; History 21D, 22D, 91D, 91S, 92, 92D, 92S, 241-242; Philosophy 48; Political Science 91D, 127, 207S; Public Policy Studies 55D; Sociology 10D and 157.

For a fuller discussion of undergraduate preparation for the study of law, students should refer to the *Duke Prelaw Handbook* or the *Prelaw Handbook* published by the

Association of American Law Schools and the Law School Admission Council, or consult the prelaw advisor in the college.

Theological Schools and Religious Work. Students contemplating theological study should correspond at the earliest opportunity with the appropriate schools and with the authorities of their respective judicatories to learn how to prepare for the specific programs they expect to enter. They should consider the following subjects: English language and literature; history, including non-Western cultures as well as European and American; philosophy, particularly its history and its methods; natural sciences, both the physical and the life sciences; psychology, sociology, and anthropology; the fine arts and music; biblical and modern languages; religion, both in the Judeo-Christian and in the Near and Far Eastern traditions. Some seminaries require Greek or Hebrew for admission. It is the understanding gained in these fields rather than the total number of credits or semester hours earned that is significant. More detailed information about theological education, not limited to Duke, may be obtained from the director of admissions of the Divinity School.

The School of Engineering

Duke University offers in the School of Engineering programs of study which lead to the degree of Bachelor of Science in Engineering. Four programs are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). These programs are biomedical engineering, civil engineering, electrical engineering, and mechanical engineering. These accredited programs, and special programs of study in interdisciplinary fields, are offered by the Departments of Biomedical Engineering, Civil and Environmental Engineering, Electrical Engineering, and Mechanical Engineering and Materials Science.

For graduation with a Bachelor of Science in Engineering degree, a student must complete successfully a minimum of thirty-four semester courses. These thirty-four semester courses must include the following:

General Requirements*

Writing	1 s.c.	This requirement is met by completing a University Writing Course.
Mathematics	4 s.c.	This requirement is met by completing Mathematics 31, 32, and 103; plus 104 or 111 or 135.†
Natural Science	4 s.c.	This requirement is met by completing Chemistry 11L, Physics 51L and 52L, and an elective course in one of the natural science departments which presents fundamental knowledge about nature and its phenomena, preferably including quantitative expression.†§

*No more than 1 s.c. credit in physical education activity and 1 s.c. credit in music activity can be used to meet Bachelor of Science in Engineering degree requirements. House courses may not be used to meet BSE degree requirements.

†A minimum of 9 s.c. credits in mathematics, natural science, and statistics are required.

§Physics 53L and 54L may be substituted for Physics 51L and 52L. Courses in mathematics, statistics, and computer science will not meet the elective requirement. A list of disallowed courses is maintained in the dean's office.

Humanities and
Social Sciences 5 s.c.

This requirement is met by completion of five courses selected from at least three of the following four areas of knowledge: Arts and Literatures (AL), Civilizations (CZ), Foreign Languages (FL), and Social Sciences (SS). At least one course must be classified SS. In order to provide depth in the subject matter, at least two of the five courses must be selected from a single department and at least one of those courses must be 100-level or above. This program of courses should reflect a thematic coherence and fulfill an objective appropriate to the engineering profession. Courses selected must be those which present essential subject matter and substance of the discipline; for example, no introductory skill courses may be used to satisfy this requirement. Likewise, courses devoted primarily to subjects such as accounting, management science, industrial management, finance, personnel administration, and ROTC do not fulfill this objective regardless of their general value in the total engineering curriculum. Courses taught in professional schools may not be used to satisfy this requirement.

Engineering and
Applied Sciences 4 s.c.

This requirement is met by completion of one course from each of four of the following six areas: electrical science, information and computer science, mechanics (solid and fluid), materials science, systems analysis, and thermal science and transfer processes. See departmental requirements, which follow, for any specific courses to be included

Digital Computation

Students are expected to have acquired digital-computer programming capability before their sophomore year. The programming capability may be satisfied by Advanced Placement or by passing Engineering 53L or Computer Science 52 or 53.

Departmental Requirements

Departmental
Specifications 16 s.c.

The department administering the major field of study will specify this requirement. In general, it will consist of both required courses and electives to be planned in consultation with the departmental advisor. Including the 4 s.c. in engineering and applied sciences listed under general requirements, a total of 13.0 s.c. in engineering work including 8.5 s.c. equivalents in engineering science and 4.25 s.c. equivalents in engineering design are required. See the individual departmental requirements, which follow.

*Total Minimum
Requirement 34 s.c.

*A maximum of two semester courses of junior or senior level air science, military science, or naval science course work may be counted in satisfying the minimum requirements of thirty-four semester courses for a baccalaureate degree in engineering. These courses must be included in the sixteen semester courses listed under departmental requirements. All other courses completed in air, military, or naval science are taken in addition to the minimum program.

Biomedical Engineering Departmental Requirements

All general requirements and departmental requirements comprising the accredited biomedical engineering major are incorporated in the following sequence, only one of several possible sequences. The student is encouraged to choose electives and select a sequence which develops broad intellectual interests.

Freshman Year

First Semester	Courses	Second Semester	Courses
Chemistry 11L	1	Chemistry 12L	1
University Writing Course	1	Physics 51L	1
Mathematics 31	1	Mathematics 32	1
Engineering 53L or Social Science or Humanities Elective	1	Social Science or Humanities Elective or Engineering 53L	1
	<u>4</u>		<u>4</u>

Sophomore Year

First Semester	Courses	Second Semester	Courses
Physics 52L	1	Biomedical Engineering 163	1
Electrical Engineering 61	1	Elective	1
Mathematics 103	1	Mathematics 111	1
*Biomedical Engineering 83 or Engineering 83	1	Social Science or Humanities Elective	1
Elective	1	Life Science Elective	1
	<u>5</u>		<u>5</u>

Junior Year

First Semester	Courses	Second Semester	Courses
Biomedical Engineering 110 or Engineering 75L	1	Biomedical Engineering 145 or Mechanical Engineering 101L	1
Electrical Engineering 64 or Biomedical Engineering 171	1	Life Science Elective	1
Statistics 113	1	Biomedical Engineering 164	1
Social Science or Humanities Elective	1	Mathematics 114	1
	<u>4</u>		<u>4</u>

Senior Year

First Semester	Courses	Second Semester	Courses
Biomedical Engineering 207	1	Biomedical Engineering Elective	1
Biomedical Engineering 101	1	Biomedical Engineering Elective	1
Biomedical Engineering Elective	1	Social Science or Humanities Elective	1
Biomedical Engineering Elective	1	Social Science or Humanities Elective	1
	<u>4</u>		<u>4</u>

Students preparing for medical school should schedule Chemistry 151L and 152L, and two life science electives before the end of their junior year by deferring some required courses to the senior year. Biomedical engineering electives include all courses with biomedical engineering numbers other than required courses. Mechanical Engineering 126 may be taken also as a biomedical engineering elective.

*Biomedical Engineering 83 is not required for students who complete a second major in electrical engineering.

Civil And Environmental Engineering Departmental Requirements

All general and departmental requirements comprising the accredited civil engineering major are incorporated in the following typical sequence of courses. This sequence is only one of several possible sequences and students are encouraged to work closely with their advisor in choosing electives and selecting a sequence of courses to develop their individual interests.

Freshman Year

First Semester	Courses	Second Semester	Courses
Chemistry 11L	1	Engineering 24 L or Engineering 25L	1
Mathematics 31	1	Mathematics 32	1
Engineering 53L or Elective	1	Elective or Engineering 53L	1
University Writing Course	1	Physics 51L	1
	<u>4</u>		<u>4</u>

Sophomore Year

First Semester	Courses	Second Semester	Courses
Engineering 75L	1	Engineering 123L	1
Mathematics 103	1	Mathematics 111	1
Physics 52L	1	Engineering 25L or Engineering 24L	1
Elective	1	Elective	1
	<u>4</u>		<u>4</u>

Junior Year

First Semester	Courses	Second Semester	Courses
Civil Engineering 122L	1	Engineering 150L	1
Civil Engineering 131L	1	Elective or Statistics 113	1
Statistics 113 or Elective	1	Elective	1
Engineering 115	1	Elective	1
Elective	1	Elective	1
	<u>5</u>		<u>5</u>

Senior Year

First Semester	Courses	Second Semester	Courses
Elective	1	Civil Engineering 192	1
Elective	1	Elective	1
Elective	1	Elective	1
Elective	1	Elective	1
	<u>4</u>		<u>4</u>

The program of electives shall include: at least one of Electrical Engineering 61L, Engineering 83L, Mechanical Engineering 101L or Biomedical Engineering 145; at least five courses in humanities and social sciences; at least one course in the natural sciences; at least two courses chosen from Civil Engineering 116, 123L, and 139L; at least two 200-level civil engineering courses. Any higher level environmental engineering course may be substituted for Engineering 24L and/or any higher level structures course may be substituted for Engineering 25L.

Electrical Engineering Departmental Requirements

The general requirements and departmental requirements comprising the accredited electrical engineering major are all incorporated in the following program. This program is presented as a guide to assist students in planning their four-year program and should not be viewed as an inflexible sequencing of courses.

Freshman Year

First Semester	Courses	Second Semester	Courses
Mathematics 31	1	Mathematics 32	1
Chemistry 11L	1	Physics 51L	1
University Writing Course	1	Approved Elective	1
Computer Science 6 or 8 or Engineering 53L or Social Science-Humanities Elective...1	1	Computer Science 6 or 8 or Engineering 53L or Social Science-Humanities Elective...1	1
	<u>4</u>		<u>4</u>

Sophomore Year

First Semester	Courses	Second Semester	Courses
Mathematics 103	1	†Mathematics 1A	1
Electrical Engineering 61	1	Electrical Engineering 62	1
Physics 52L	1	Electrical Engineering 64	1
Social Science-Humanities Elective	1	Social Science-Humanities Elective.....	1
	4	Approved Elective.....	1
			5

Junior Year

First Semester	Courses	Second Semester	Courses
†Mathematics 1B.....	1	†Mathematics 1C	1
*Electrical Engineering 1A.....	1	Electrical Engineering 170	1
Electrical Engineering 63	1	*Electrical Engineering 1B	1
Social Science-Humanities Elective	1	§Social Science-Humanities Elective.....	1
	4	§Natural Science Elective	1
			5

Senior Year

First Semester	Courses	Second Semester	Courses
*Electrical Engineering 2A.....	1	Electrical Engineering Elective	1
Electrical Engineering Elective	1	*Electrical Engineering 2B	1
‡Engineering Elective.....	1	Approved Elective	1
Approved Elective.....	1	Approved Elective	1
	4		4

Note: The selection of approved electives should take into account a departmental requirement that a student must have accumulated by graduation time the equivalent of 13.0 engineering courses including 4.25 engineering design and 8.5 engineering science courses. This engineering design requirement must include a course which is more than 0.5 ED and must be taken in the junior or senior year of the program. This course must have as a prerequisite at least one course in the discipline. Engineering 23, Engineering 174, and Engineering 175 may not be counted toward the departmental requirement.

In order to satisfy the School of Engineering distributional requirement of four courses in engineering and applied science, the student may use Electrical Engineering 61 as an electrical science course and Electrical Engineering 64 as a systems analysis course. The remaining two courses may be selected from any two of the following areas: information and computer science (Engineering 53L or Computer Science 52 or 53 may be used to satisfy this requirement), mechanics, materials science, and thermal sciences.

An up-to-date list of acceptable engineering design and engineering science courses may be obtained from the departmental office.

*To be selected from two of the following areas: computer engineering; signal processing and communications; solid state electronics and circuits; systems and robotics; electromagnetic fields and optics; power electronics.

†Students interested in computer engineering, signal processing and communications, systems and robotics, or power electronics should select Mathematics 104, 131, and 135 or Statistics 113. Students interested in solid state electronics and circuits or electromagnetic fields and optics should select Mathematics 111, 114, and 135 or Statistics 113.

‡To be selected from: mechanics (Engineering 75L or 123L, Mechanical Engineering 126L, or Biomedical Engineering 110); thermal sciences (Mechanical Engineering 101L, Electrical Engineering 176, Mechanical Engineering 150L, or Biomedical Engineering 145 or 202); or materials science (Engineering 83L or Biomedical Engineering 215).

§The following courses are recommended: Chemistry 12L; Physics 100, 105, 176, 181, and 185; Biology 21L.

Mechanical Engineering and Materials Science Departmental Requirements

The general requirements and departmental requirements comprising the accredited mechanical engineering major are all incorporated in the following program. This sequence of the courses is presented as an overview of the program and is one of two recommended sequences of the course requirements.

Freshman Year

First Semester	Courses	Second Semester	Courses
Mathematics 31	1	Mathematics 32	1
Chemistry 11L	1	Physics 51L	1
University Writing Course	1	Engineering 83L	1
Engineering 53L or *Elective	1	*Elective or Engineering 53L	1
	4		4

Sophomore Year

First Semester	Courses	Second Semester	Courses
Mathematics 103	1	Mathematics 111	1
Physics 52L	1	Mechanical Engineering 101L	1
Engineering 75L	1	Engineering 123L	1
*Elective	1	*Elective	1
*Elective	1	*Elective	1
	5		5

Junior Year

First Semester	Courses	Second Semester	Courses
Mechanical Engineering 130L	1	Mechanical Engineering 141L	1
Mechanical Engineering 120L	1	Mechanical Engineering 150L	1
Mechanical Engineering 126L	1	Mathematics 114	1
Mechanical Engineering 115L	1	Physics 171L	1
	4		4

Senior Year

First Semester	Courses	Second Semester	Courses
Mechanical Engineering 160L	1	Mechanical Engineering Elective	1
Mechanical Engineering Elective	1	†Technical Elective	1
†Technical Elective	1	*Elective	1
*Elective	1	*Elective	1
	4		4

*Part of a program of approved electives planned with the student's faculty advisor to suit individual interests and abilities. The program must include five social science-humanities courses selected to meet the general requirements of the School of Engineering.

†One of two electives restricted to the areas of engineering, mathematics, or natural sciences. A list of disallowed courses is maintained in the departmental office.

Declaration of Major. A student is urged to declare a major by the time of registration for the first semester of the sophomore year, but is required to do so by the time of registration for the first semester of the junior year. Declaration of major is accomplished by completing a form available in the Office of the Dean of Engineering.

Double Major. If an engineering student completes simultaneously the requirements for a departmental major in arts and sciences and the requirements for a Bachelor of Science in Engineering degree, or satisfies simultaneously the requirements for two engineering majors, the official record will indicate this fact. However, the director of undergraduate studies for the second major must certify that the departmental major requirements have been met. The student must initiate the procedure, either through the dean of the School of Engineering or through the director of undergraduate studies in the second department. The completion of the requirements for the major in this department must be confirmed no later than the time of registration for the final

semester. Courses which are common to both majors shall be counted toward satisfying the requirements of both majors.

Interdisciplinary Programs in Engineering. These programs, leading to the Bachelor of Science in Engineering degree, provide opportunities for students to establish special majors in interdisciplinary fields such as computer engineering, environmental engineering, and materials science. Programs with a broad foundation in the engineering sciences also may be developed under this program by those who intend to enter non-engineering professions. Although not individually accredited, these programs satisfy the national engineering accreditation criteria.

Any student, in consultation with the advisor or another faculty member, may propose a unique combination of courses designed to meet particular career objectives. A proposal must be submitted to the associate dean of the School of Engineering and the Engineering Faculty Council for approval; it may be submitted as early as the second semester of the freshman year and must be submitted before the beginning of the senior year. The proposal must include a letter stating the student's reasons for pursuing the suggested program of study.

International Honors Program. This program consists of forty semester courses: six semester courses beyond the basic accredited programs in addition to one semester of study abroad or two summers of study abroad. Some of the required distributional electives in Comparative Area Studies and foreign language will satisfy the humanities and social sciences requirement of the basic accredited programs. Specific program requirements and an application may be obtained in the Office of the Dean of Engineering.

Bachelor of Science in Engineering/Master of Science Program. This program provides students with an opportunity to plan a coordinated five-year program of studies in the School of Engineering leading to both the Bachelor of Science in Engineering and Master of Science degrees. Application for admission to this integrated program may be made during the junior or senior year. Provisional admission to the Graduate School may be granted when the student enrolls for the semester during which the Bachelor of Science in Engineering degree requirements will be completed. Graduate level courses during this period which are in excess of Bachelor of Science in Engineering requirements may be credited toward fulfillment of the Master of Science degree requirements.

Students must complete thirty semester hours of credit specifically approved for the Master of Science degree under the prevailing graduate rules; up to six of these hours may be thesis research if the program includes a written master's thesis. No more than nine semester hours of graduate work can be completed concurrently with completing the Bachelor of Science in Engineering degree requirements.

Bachelor of Science in Engineering/Master of Business Administration. This program provides students with an opportunity to plan a coordinated five-year program of studies leading to the Bachelor of Science in Engineering and Master of Business Administration degrees. *Admission to the business program is highly competitive and generally requires some full-time work experience or business-related summer internships.* Joint degree students are enrolled in the School of Engineering for three years and in the Fuqua School of Business for two years. Typically, four engineering courses taking during the fifth year fulfill requirements for both degrees.

Residence Requirements. At least seventeen semester courses must be completed satisfactorily at Duke. This must include the work of the final two semesters, with the following exceptions: the student who has completed more than four full semesters of work at Duke may take the last two courses elsewhere; others may take the last course elsewhere. The courses taken elsewhere must be approved in advance by the student's major advisor and academic dean.

Pass/Fail Grading Option. With the consent of the instructor and the faculty advisor, an engineering student may choose to be graded on a pass/fail basis in up to four unrestricted electives or social sciences-humanities electives within the thirty-four-course program. A student may take no more than one course on a pass/fail basis each semester.

Repetition of Courses. An engineering student who has earned a grade of *D-*, *D*, or *D+* in a required mathematics course or a required engineering course may, with permission of his or her advisor, director of undergraduate studies, and academic dean, repeat the course. Both grades will remain on the student's record. Only one credit may be counted toward satisfying continuation requirements and toward fulfilling graduation requirements.

Annual Recognition. In acknowledgment of high academic achievement, recognition is given each summer to freshmen, sophomores, juniors, and seniors if the following requirements are met:

1. A normal academic load has been carried in the fall and spring terms.
2. Grades other than *P* have been earned in six semester courses.
3. No incomplete or failing grade has been received during the fall and spring terms.



The Dean's List recognizes students who earn a 3.3 average on all work in both the fall and spring terms. The Dean's List with Distinction includes students who earn a 3.6 on all work in both the fall and spring terms of an academic year.

Continuation Requirements. A student must achieve a satisfactory record of academic performance each semester and make satisfactory progress toward graduation to remain enrolled in the university.

A student must pass at least three courses in each semester, except for the first semester of the freshman year, in which at least two courses must be passed. A student who fails to meet this continuation requirement must leave the university for at least two semesters. A complete summer session may be counted as a semester. Following application for readmission, return must be approved by the dean and the director of undergraduate studies in the student's major department. If the student thereafter fails to pass three courses in a semester, permanent dismissal from the university usually results. A student who enrolls in more than four courses in a given semester and fails two or more of them will not be permitted to enroll for more than four courses in the following semester without approval of the dean. In addition, a student may be dismissed temporarily or permanently for failing to make satisfactory progress toward graduation, including satisfactory progress toward fulfillment of curricular requirements within ten semesters.

The term satisfactory progress shall be defined also by the following schedule:

1. To begin enrollment in the second year, a student must have passed 6 s.c. at Duke and earned *P*, *C-*, or better in 4 s.c.
2. To begin enrollment in the third year, a student must have passed 13 s.c. at Duke and earned *P*, *C-*, or better in 11 s.c.
3. To begin enrollment in the fourth year, a student must have passed 20 s.c. at Duke and earned *P*, *C-*, or better in 18 s.c.
4. To begin enrollment in the fifth year, a student must have passed 27 s.c. at Duke and earned *P*, *C-*, or better in 25 s.c.

Grade Requirement for Graduation. Of the thirty-four semester courses which fulfill the specified categories in the Bachelor of Science in Engineering degree requirements, thirty-two or their equivalent in number must be passed with grades of *P*, *C-*, or better.

Academic Procedures and Information



Advanced Placement

Scores on the tests discussed below and documented previous educational experience are the criteria used to determine a student's qualifications for certain advanced courses. If questions arise, students should consult the director of undergraduate studies in the appropriate department or the university registrar.

College Board Advanced Placement Program (APP) Examinations. A score of 4 or 5 on College Board Advanced Placement Program Examinations, taken prior to matriculation in college, is the basis for consideration for credit and/or placement in advanced courses in art, biology, chemistry, computer science, economics, English,* French, German, history, Latin, music, physics,† political science, psychology, and Spanish. The Department of Mathematics will consider a score of 3 for placement beyond the introductory course. The record of a student presenting such a score and desiring to continue in the same subject at Duke will be evaluated for credit and for placement in an advanced course. Departmental policies regarding advanced placement and credit may vary. In the case of French, German, Latin, and Spanish, APP scores of 4 or 5 may result in placement in courses at the 100 level; approval of the director of undergraduate studies or supervisor of freshman instruction in the appropriate department is required before final placement is made. Credit may be granted for one or two courses in each subject area, with the approval of the academic department concerned. Scores should be submitted to the Office of the Registrar no later than the end of the sophomore year. Also, see the section on residence requirements in the chapter "Degree Programs."

*The score in English Advanced Placement, although qualifying a student for advanced courses in literature, does not satisfy the requirement in Writing.

†In order to receive credit for Physics 51L or 52L, a student must take a validation test during orientation.

College Board Tests. Scores on College Board Tests are the basic criteria for placement in French, German, Spanish, Latin, and mathematics. Course credit is not given for courses bypassed. The following tables will assist students in making reasonable course selections in the subjects indicated.

	<u>College Board Achievement Score</u>	<u>Placement</u>
French*	200-370	French 1-2
	380-440	French 12
	450-540	French 63
	550-590	French 76
	600 plus	French 100-level course
German	200-400	German 1†
	410-510	German 65-66
	520-590	German 69
	600 plus	Third year‡
Spanish*	200-420	Spanish 1-2
	430-490	Spanish 12
	500-570	Spanish 63
	580-620	Spanish 76
	630 plus	Spanish 100-level course
Latin	200-520	Latin 1
	530-630	Latin 63
	640 plus	Third year‡
Mathematics§	460-540	Math. 19
	550-800	Math. 31L, or with one year of high school calculus, Math. 41

*In these languages students are permitted to drop back one level without loss of credit (e.g., from 100 to 76 or from 76 to 63). No credit will be allowed for courses two levels below the achievement score (e.g., students with a score of 640 in French or Spanish could not receive credit for 63, but could for 76). In no case will credit be given for 1-2 to students with three or more years of high school French or Spanish.

†The first year of a language may *not* be taken for credit by a student who has completed more than two years of that language in secondary school. In rare cases, an exception may be granted with permission of the director of undergraduate studies in the appropriate department.

‡An exception may be granted in consultation with the director of undergraduate studies.

§In the absence of an achievement test score, course placement is determined by the SAT score as follows: 600 or below—Math. 19; 610-800—Math. 31L.

Newly admitted students who wish to continue the study of French, German, Spanish, or Latin begun in secondary school must take a College Board Achievement Test or College Board Advanced Placement (APP) Examination in that language by June of the senior year in secondary school. Students who plan to take mathematics at Duke are expected to present College Board SAT, Mathematics Achievement (Level I or Level II), or Advanced Placement Program (APP, either level AB or level BC) scores. Placement testing is not offered during New Student Orientation in mathematics or in languages covered by the Achievement Test or Advanced Placement Examination programs of the College Board. New students who wish to continue the study of French, German, Spanish, or Latin but who found that it was not possible due to extraordinary circumstances to take the appropriate College Board examinations, may petition to take a placement test at Duke University prior to the beginning of New Student Orientation. Petitions explaining the reason a test was not taken must be received by the Coordinator of Testing, Counseling and Psychological Services, P.O. Box 90955, by July 1. If the petition is granted, a fee will be charged to cover testing costs. Because residence halls

are not open before the beginning of New Student Orientation, students whose petitions are granted will also need to arrange accommodations in the Durham area.

All students who plan to take mathematics during their first semester at Duke, and who do not submit the College Board SAT or Achievement Test or Advanced Placement Program score in mathematics, should consult with the supervisor of freshman instruction in mathematics during New Student Orientation. New students who have been placed in Mathematics 19 or 31 on the basis of College Board SAT, Achievement, or Advanced Placement Examinations but who believe that their background in mathematics justifies a higher placement, should also confer during New Student Orientation with the supervisor of freshman instruction or with the director of undergraduate studies in the department of mathematics.

International Entrance Examinations. Duke University recognizes the International Baccalaureate Program, the French Baccalaureate, the British A-Level Examinations, the Hong Kong A-Level Examinations, the German Abitur and the Swiss Federal Maturity Certificate. Advanced standing credit and/or placement can be awarded upon the recommendation of the concerned Duke department. Scores acceptable for consideration are determined by the faculty and evaluated by the university registrar.

Placement in Languages Other Than French, German, Spanish, and Latin. Students who wish to continue in any language other than French, German, Spanish, or Latin should consult with the appropriate director of undergraduate studies. In the case of Russian, the department offers an examination which is used in conjunction with other criteria for placing students at the appropriate level.

Reading Out of Introductory Courses. Students demonstrating academic ability may be granted the option of reading out of an introductory or prerequisite course in order to allow them to advance at their own pace to upper-level work. No course credit may be earned by reading out. Reading for a course and auditing are mutually exclusive procedures. Students should consult with the appropriate directors of undergraduate studies who must approve the proposed program of reading. Students may be certified for advanced course work by passing a qualifying examination prepared by the department. When an advanced course is completed, an entry is made on the permanent record that the qualifying examination was passed, but no course credit is awarded.

Transfer of Work Elsewhere

Work Done Prior to Matriculation at Duke. First-year Duke students may submit for evaluation college courses taken after the commencement of the student's junior year of high school. Students transferring from a degree program in another accredited institution may be granted credit for up to seventeen semester-course credits. Ordinarily, students will not be awarded more than four semester-course credits for one semester's work unless they have satisfactorily completed more than the normal course load at the institutions from which they are transferring credit. Courses taken at other institutions prior to matriculation at Duke are evaluated by the university registrar and the faculty.

Evaluation of Work Taken Elsewhere. Courses in which grades of less than C- have been earned are not accepted for transfer credit; students seeking transfer credit for courses in which they earned a P grade must present official verification that the P is equivalent to at least at C- grade. The semester-course unit of credit awarded at Duke for satisfactorily completed courses cannot be directly equated with semester-hour or quarter-hour credits. Credit equivalency is determined by the university registrar. All courses approved for transfer are listed on the student's permanent record at Duke, but grades earned are not recorded. Further information is available from the university registrar.

After matriculation as a full-time degree candidate at Duke University, a student in Trinity College of Arts and Sciences may receive credit toward the Bachelor of Science or Bachelor of Arts degree for two courses taken at another institution in the United States, whether in the summer while regularly enrolled at Duke, while withdrawn voluntarily from the college, or while on leave of absence for personal, medical, or financial reasons. Trinity College students, when eligible, may also receive transfer credit for up to ten courses taken in an approved program for study abroad (see the section on Study Abroad). In some cases, transfer credit may be received for a maximum of four of the final eight courses toward the bachelor's degree (see the section on Residence Requirements). Once matriculated, however, a student may not receive credit for more than a *total* of ten transfer courses toward the Bachelor of Science or Bachelor of Arts degree. Full-time degree candidates in the School of Engineering may receive credit toward the Bachelor of Science in Engineering degree for a maximum of four courses taken at another institution. Ordinarily, no credit will be accepted for course work taken while a student is withdrawn involuntarily. For purposes of this regulation, advanced placement and interinstitutional credit (see the section on agreement with neighboring universities) are not considered as work taken at another institution.

Students may not transfer credit from two-year colleges after completing their sophomore year. At least half the courses submitted toward fulfillment of a student's major field must be taken at Duke, but departments may make exceptions to this rule in special circumstances. No credit is given for work completed by correspondence, and credit for not more than two semester courses is allowed for extension courses.

Approval for Courses Taken Elsewhere. Approval forms for courses to be taken at institutions other than Duke may be obtained from the offices of the academic deans. Students wishing to transfer credit for study at another accredited college while on leave or during the summer must present a catalog of that college to the appropriate dean and director of undergraduate studies and obtain their approval *prior* to taking the courses.

Advising

Students and their advisors confer when necessary, but they should confer at least once before every registration period to review goals, plans for achieving them, and any problems encountered or anticipated. Before declaring a major in Trinity College, students confer with the premajor advisor, the academic dean for premajor students, or the academic dean in the division of their interests. Upon declaring a major, the student is assigned a faculty advisor; the academic dean for that division is also available for consultation. In the School of Engineering, the advisor's signature is necessary for registration and all course changes. Much good advising is informal and occurs in conversation with members of the faculty. Students have the responsibility to understand and meet the requirements for the curriculum under which they are studying and should seek advice as appropriate.

Registration

Students are expected to register at specified times for each successive term. Prior to registration each student receives special instructions and registration materials. Students prepare a course program, and submit it at an appointed time to their advisors for review. In the School of Engineering, the schedule must be approved by the advisor.

Students who expect to obtain certification to teach in secondary schools should consult an advisor in the education program prior to each registration period to ensure that they are meeting requirements for state certification and that they will have places reserved for them in the student teaching program.

Those who register late are subject to a \$50 fine. In the case of students enrolled in Continuing Education, late fees are assessed after the first day of classes. Students who fail to register for the fall or spring semester are withdrawn and must apply for

readmission if they wish to return; they also forfeit their registration deposits unless they indicate at the time of registration their intention not to continue in the university the following term. Those students who have not paid any fees owed to or fines imposed by the university (such as laboratory fees, library fines, and parking fines) by the date specified for registration for the following term will not be permitted to register for the following term until such fees and fines have been paid in full, notwithstanding the fact that the student may have paid in full the tuition for the following term.

Students planning to register for a course under the reciprocal (interinstitutional) agreement must have the course approved by the appropriate director of undergraduate studies and their academic dean. Further information about registration procedures once approval is given may be obtained from the Office of the Registrar. See the chapter "Special Programs" for information regarding the reciprocal agreement with neighboring universities.

Duke Identification Card and Term Enrollment. Undergraduate students are issued identification cards which they should carry at all times. The card is a means of identification for library privileges, University functions, and services available to university students. Students are expected to present their card on request to any university official or employee. The card is not transferable, and fraudulent use may result in loss of student privileges or suspension. Loss of the card should be reported immediately to the Office of the Registrar where new ones can be obtained for \$10. Official enrollment is required for admission to any class. Failure to report, or to account beforehand for an absence, entails a loss of registration in courses.

Concurrent Enrollment. A student enrolled at Duke may not enroll concurrently in any other school or college without special permission of the appropriate academic dean. See, however, the statement regarding the reciprocal agreement with the University of North Carolina at Chapel Hill, North Carolina Central University in Durham, and North Carolina State University at Raleigh.

Course Changes after Classes Begin in the Fall and Spring Terms. During the drop/add period changes may be made in course schedules.

In Trinity College of Arts and Sciences, students may drop and add courses during the first week of classes in the fall and spring terms at their own discretion; during the second week of the drop/add period they may drop courses at their own discretion, but the approval of the appropriate instructor is required for adding a course. After the drop/add period no course may be added; also, a course may not be changed to or from the pass/fail or audit basis. To withdraw from a course, students must obtain permission from their academic deans, and for reasons of course overload the academic dean may give permission up to midterm. Ordinarily, courses may not be discontinued after midterm. In extraordinary circumstances, however, e.g., for reasons of health, the academic dean may allow a student to withdraw. After the drop/add period, the student receives a *WP* grade (withdraw passing) or *WF* (withdraw failing) from the instructor. Course work discontinued without the dean's permission will ordinarily result in a grade of *F*.

Within the School of Engineering, the approval of the advisor is necessary for dropping or adding courses after classes begin. After the drop/add period no course may be added, and in order to withdraw from a course students must obtain permission from their academic dean. Factors to be considered by the dean include health, necessary outside work, and, up to the time midterm grades are issued, a course overload. Until the last four weeks of classes in the semester, the instructor must certify the student's standing in the course as satisfactory or as failing. In the former case a *WP* will be entered on the permanent record and in the latter, a *WF*. During the last four weeks of classes in any semester, or the equivalent in the summer terms, *W* will be assigned if, in the judgment of the student's dean, compelling and extraordinary circumstances make it

necessary for the student to drop the course; otherwise, the course must be continued to the end of the semester. A course discontinued without approval will result in a grade of F.

When students note an error in their course schedules, they should consult with their academic dean.

Course Changes for the Summer Terms. Course changes are accomplished through ACES, the telephone registration system. Duke students who are blocked from continuing into a summer term must see their academic dean.

Courses may be added before or during the first three days of the term (see also the section on late registration and payment). After the third day of the term, no course may be added. Prior to the first day of the term, students may drop a course or courses for which they have registered without penalty. During the first three days of the term, students will be charged \$150 per course (\$75 per half-course or per audited course) for dropping a course or courses if this results in any reduction in course load for the term. With the permission of the academic dean a course may be dropped until the end of the fourteenth day of a regular summer term (eleventh day at the Marine Laboratory); the instructor then assigns a *WP* or *WF* grade. Course work discontinued without the approval of the dean will ordinarily result in a grade of F. (See also the section on Withdrawal Charges and Refunds.)

Course Load and Eligibility for Courses

Students are reminded that it is their responsibility to be certain that their course load conforms with academic requirements. The normal and expected course load in the fall or spring term is four semester courses. Students should take note that two additional semester credits are needed in order to meet the thirty-four (34) semester-course requirement for graduation. To take fewer than four or more than five semester courses, students must have the approval of their academic deans. No student, however, may take more than six courses in any semester. With the approval of their academic dean, seniors in Trinity College and the School of Engineering who need fewer than eight semester courses for graduation requirements may take an underload.

Maximum course program for one term of the summer session is two courses, one of which may be a laboratory course. Students in the School of Engineering may enroll in two laboratory courses. In addition, a student may enroll in a physical education activity or dance activity course for one-half course credit.

Self-pacing during a given calendar year (two regular semesters plus two Duke summer terms) is possible with the approval of the student's academic dean and faculty advisor (and in consultation with the Office of Undergraduate Financial Aid, if the student is receiving monetary support from the university). Prior to the beginning of a semester, a student may apply to take fewer than four courses for one or more semesters in a given calendar year after the freshman year, providing the student can meet the continuation requirements described in the chapter "Degree Programs." Advanced placement credits and summer work taken elsewhere are excluded when minimum annual continuation requirements are considered under this plan.

Eligibility for Courses. The rules established by the Graduate School provide that juniors and well-qualified sophomores may enroll in a 200-level (senior-graduate) course if they have obtained written consent of the instructor, as well as that of the director of graduate studies in the department concerned. Undergraduate students may not enroll in 300- or 400-level courses.

Seniors who, at the beginning of the final term, lack no more than three semester courses toward the fulfillment of the requirements for the Bachelor of Arts or Bachelor of Science degree may enroll in graduate courses, for a maximum course load of five semester courses. Admission to the Graduate School is necessary.

Students may not register for two courses meeting at the same time. In Trinity College no course may be repeated for credit or a grade if a C- or higher has been earned previously, except where noted in the course description. Physical education activity courses may be repeated, but without graduation credit. A course previously passed, however, may be audited.

Students who receive a D-, D, or D+ in any course in Trinity College are allowed to repeat the course at Duke. The grade earned in the repeated course as well as the grade earned originally appear on the transcript, the former identified as a repeat; both grades count in the grade point average, but the credit for only one counts toward the required number of courses for continuation and the thirty-four (34) courses required for graduation. Forms requesting to repeat a course are available in the offices of the academic deans.

Course Audit

Students who audit a course submit no daily work and take no examinations. They do not receive credit for the course. With the written consent of the instructor, a full-time degree student is allowed to audit one or more courses in addition to the normal program. Physical education activity, studio art, applied music, and dance technique/performance courses may not be audited. In the fall or spring term, a part-time degree student may audit courses by payment for each course audited. In a summer term, a student carrying two courses for credit may be given permission to audit, without additional fees, nonlaboratory courses with the above exceptions. A student in a summer term carrying less than a full program for credit may secure permission to audit (above exceptions apply) but is required to pay half the university fee for the course. After the drop/add period in any term, no student classified as an auditor in a particular course may take the course for credit, and no student taking a course for credit may be reclassified as an auditor. A student may not repeat for credit any course previously audited.

Courses may be audited by faculty members, staff, alumni, employees and their spouses, as well as spouses of currently enrolled students, and members of the Institute for Learning in Retirement; courses audited on the Microelectronics Center of North Carolina (MCNC) Network may be audited without concurrent enrollment in another course. Formal application is not necessary; written permission from the instructor must be obtained and a course card must be signed by the director of the Office of Continuing Education. Consult the chapter "Financial Information" for the appropriate fee schedule. Auditors must register on the Friday before classes begin.

Independent Study

Independent study enables a student to pursue individual research and reading in a field of special interest under the supervision of a member of the faculty. A student—with the approval of an advisor, the instructor, and the director of undergraduate studies in the instructor's department—may enroll in independent study for any term at Duke. In Trinity College, instructors of independent study courses are expected to meet with the students enrolled at least once every two weeks during the fall or spring and at least once each week during a summer term.

House Courses

House courses, offered in the fall and spring terms, are intended to provide academic experiences that are not offered by regular departmental courses. A house course must be hosted by a residential unit, sponsored by a faculty member in the arts and sciences, reviewed by the department of that faculty member, and approved by the Committee on Courses of Instruction of the Arts and Sciences Council. House courses carry a half-course credit. In the School of Engineering, house courses cannot be used

to meet degree requirements. In Trinity College not more than two semester-course credits earned in house courses can be counted toward the course requirement for graduation. House courses do not count toward other requirements. Grades are submitted only on the pass/fail basis. The academic deans can provide further details.

Submission of Term Paper

Students who wish (under unusual circumstances) to submit a single paper for credit in more than one course must receive prior written permission from each course instructor. The student must indicate the multiple submission on the title page of the paper.

Declaration of Major or Division in Trinity College of Arts and Sciences

Before declaring a major or interdepartmental concentration in Trinity College, students work with their premajor advisors and with other members of the faculty and staff to develop a "long-range academic plan," which outlines academic objectives and plans for meeting goals. The plan should describe the proposed major program, related classroom and outside experiences, and the general pattern of elective courses, as well as the means by which the student will meet established college requirements for graduation. Although students may declare a major as early as the spring of the first undergraduate year, all students must secure formal approval of their long-range plans and must declare their majors before the last day of classes in their fourth undergraduate semester. Forms for filing the official long-range plan and for registering the initial declaration of major are available in the Premajor Advising Center.

After declaring a major, students are assigned an advisor in the department of the major and an academic dean in the division of concentration. Students who, having already declared a major, wish to change their area of concentration complete a form in the Office of the Registrar and subsequently develop a revised long-range academic plan in consultation with appropriate faculty members in the new major department and, if necessary, with their academic dean.

A student may declare an interdepartmental concentration after conferring with the directors of undergraduate studies of the departments involved, and they or other advisors assist the student in preparing a program of course work. The program, which must be planned early in the undergraduate career, must consist of at least three courses beyond the introductory level in each of the departments. One of the departments should be identified as primarily responsible for the student's advising. A copy of the plan for the program, with a descriptive title which will appear on the student's permanent record, should be presented, along with the written approval of the directors of undergraduate studies, to the appropriate academic dean. A student who declares an interdepartmental concentration must satisfy all other requirements for Program I.

A student who wishes to declare a second major should do so in the Office of the Registrar before registering for the final term. If the student's second major is not offered within the degree to be granted for completion of the first major, a notation of the second major will appear on the transcript. Majors offered within each degree are listed below:

Bachelor of Arts. African and Afro-American studies, art history, biology, biological anthropology and anatomy, Canadian studies, chemistry, classical languages, classical studies, comparative area studies, computer science, cultural anthropology, drama, economics, English, environmental science and policy, French studies, geology, Germanic languages and literature, history, Italian studies, literature, mathematics, medieval and Renaissance studies, music, philosophy, physics, political science, psychology, public policy studies, religion, Russian, sociology, Spanish, visual arts, and women's studies.

Bachelor of Science. Biological anthropology and anatomy, biology, chemistry, computer science, geology, mathematics, physics, and psychology.

Changes in Status

Withdrawal and Readmission. Students who wish to withdraw from the college must give official notification to their academic dean. Notification must be received prior to the beginning of classes in any term or tuition will be due on a pro rata basis. (See the section on refunds in the chapter "Financial Information.") For students withdrawing on their own initiative after the beginning of classes and prior to the last four weeks of regular classes in the fall or spring term, or before the last two weeks of regular classes in a summer term, a *W* is assigned in lieu of a regular grade for each course. After these dates an *F* grade is recorded unless withdrawal is caused by an emergency beyond the control of the student, in which case a *W* is assigned by the student's academic dean.

Students may be involuntarily withdrawn for academic reasons, financial reasons, and violation of academic regulations. The expectations pertaining to each are found in the chapters "Degree Programs," "Financial Information," and this chapter, "Academic Procedures and Information."

Applications for readmission are made to the appropriate school or college. Each application is reviewed by officers of the school or college to which the student applies, and a decision is made on the basis of the applicant's previous record at Duke, evidence of increasing maturity and discipline, and the degree of success attendant upon activities during the time away from Duke. Students who are readmitted usually cannot be housed on campus.

Applications for readmission must be completed by November 1 for enrollment in the spring, by April 1 for enrollment in the summer, and by July 1 for enrollment in the fall.

Leave of Absence. An upperclassman in good standing may apply in writing to the appropriate academic dean to take a leave of absence for one or two semesters; the deadline for application for a leave is the end of the registration period for the semester immediately preceding the leave. Students returning from approved medical, financial, personal, or study abroad leaves and desiring housing on campus will be placed in the general housing lottery, provided they have submitted the appropriate information to the Office of Residential Life by their published deadline noted above and provided that they lived on campus before taking their approved leave. Unless an exception for an emergency is authorized by the students' academic deans, students applying after the course registration cited above will lose their priorities in university housing for the period following the leave.

Registration materials will be mailed to a student on leave, but final registration is, of course, contingent upon the student's fulfilling the terms of the leave. A student failing to register while on leave will be withdrawn from the university and will have to apply for readmission.

A student who undertakes independent study under Duke supervision and for Duke credit is not on leave of absence even if studying elsewhere. The student registers at Duke as a nonresident student and pays the appropriate fees or tuition at Duke. This also applies to Duke programs conducted away from the Durham campus.

Transfer between Duke University Schools. Students in good standing may be considered for transfer from one Duke undergraduate school or college to another, upon written application and request for a letter of recommendation from their academic dean. The review of requests to transfer involves consideration of a student's general academic standing, citizenship records, and relative standing in the group of students applying for transfer. The school or college to which transfer is sought will give academic counseling to a student as soon as intention to apply for transfer is known, although no commitment will be implied.

A student may apply to transfer at any time prior to receiving a baccalaureate degree. A student transferring to Trinity College of Arts and Sciences from the School of Engineering, prior to receiving a baccalaureate degree, may not use more than six professional school credits toward the Bachelor of Arts or Bachelor of Science degree. If admitted after having earned a baccalaureate degree, a student must complete in Trinity College a total of seventeen additional courses. Transfer credit, AP credit, or courses previously used to satisfy requirements for the degree in engineering cannot be counted.

Full-Time and Part-Time Degree Status. Ordinarily candidates for degrees are expected to enroll for a normal course load each semester. Students who need to change from full-time to part-time status must request permission from their academic dean. Except for extraordinary circumstances, such permission is given only to students for the final semester of their senior year. So that the number of part-time students can be taken into account in enrollment and budget decisions, seniors must plan ahead and register their intention to be part-time one year in advance of the semester of part-time status. Part-time students may register for not more than two courses (or two courses and a half-credit physical education activity). Part-time students may not live in university housing.

Resident and Nonresident status. See the chapter "Campus Life and Activities."

Nondegree to Degree Status. A nondegree student must apply to the Office of Undergraduate Admissions for admission to degree candidacy.

Class Attendance, Excused Absences, and Tests

Responsibility for class attendance rests with the individual student, and since regular and punctual class attendance is expected, the student must accept the consequences of failure to attend. Instructors may refer to the student's academic dean a student who is, in their opinion, absent excessively. As a rule, absences from required classes and tests are excused only for illnesses certified by a medical official of the University or for authorized representation of the university in out-of-town events. Officials in charge of groups representing the university are required to submit the names of students to be excused to the appropriate deans' offices forty-eight hours before absences are to begin.

Class times are officially scheduled at registration unless designated "to be arranged" (TBA). No class time may be changed without prior permission of the University Schedule Committee. Within-class tests (except for the final) are to be given at the regular class meeting times. Exceptions are made for block tests that have been approved by the University Schedule Committee.

Incomplete Course Work

If because of illness, emergency, or reasonable cause a student cannot complete work for a course, the student may request in writing to his or her academic dean the assignment of an *I* (incomplete) for the course. If the request is approved by the instructor in the course and by the student's academic dean, then the student must satisfactorily complete the work prior to the last class day of the fifth week of the subsequent semester or a grade of *F* will be recorded for the course. An *I* taken in the fall semester must be resolved in the succeeding spring term; an *I* taken in the spring or summer must be completed in the following fall term. A student not enrolled in the university during that subsequent semester will have until the end of the fifth week of the next semester of matriculation to clear the *I*. An *I*, once recorded, will remain permanently on the student's record, even after the final grade is subsequently assigned for the course. In addition, an *I* cancels eligibility for annual honors, i.e., the Dean's List and Dean's List with Distinction. If a student whose work is incomplete is also absent from the final examination, an *X* is assigned for the course. Students may not complete work in a course

after graduation. For a discussion of the possible impact of an *I* grade on continuation, see the sections on satisfactory performance each term in the chapter “Degree Programs.”

Final Examinations and Excused Absences

The times and places of final examinations for the fall and spring terms are officially scheduled by the University Schedule Committee, generally according to the day and hour of the regular course meeting; changes may not be made in the schedule without the approval of the committee. If a final examination is to be given in a course, it will be given at the officially scheduled time. Take-home examinations are due at the regularly scheduled hour of an examination, based on the time period of the class. In fall or spring courses where final examinations are not scheduled, examinations may not be given in the last week of classes. In the summer session, final examinations are held on the last two days of each term as specified in the summer session brochure calendar. Final examinations for short courses are held on the last day of the course.

No later than the end of the first week of classes of the fall and spring term, the instructor is required to announce plans for the final examination exercise. Unless departmental policy stipulates otherwise, the form of the final exercise is determined by the instructor. However, a final written examination may not exceed three hours in length and a final take-home examination may not require more than three hours in the actual writing.

If a student is absent from a final examination, an *X* is given instead of a final grade unless the student’s grade in the class is failing, in which case the instructor may submit an *F*. The student must present an acceptable explanation for the absence to the appropriate academic dean within forty-eight hours after the scheduled time of the examination. The *X* is converted to an *F* if the academic dean does not approve the absence. If the absence is excused by an academic dean, the student arranges with the dean and the instructor for a make-up examination to be given at the earliest possible time. An excused *X* not cleared by the end of the fifth week of the following semester is converted to an *F*. A student not enrolled in the university during that following semester has until the end of the fifth week of the next semester of enrollment to clear the *X* unless an earlier deadline has been established by the instructor and the academic dean.

Grading and Grade Requirements

Final grades on academic work are sent to students after the examinations at the end of each term. Midterm advisory grade reports for freshmen are issued in the fall and spring.

Passing Grades. Passing grades are *A*, exceptional; *B*, superior; *C*, satisfactory; *P*, passing (see pass/fail option below); and *D*, low pass. These grades may be modified by a plus or minus. A *Z* may be assigned for the satisfactory completion of the first term of a two-course sequence, and the final grade for both courses is assigned at the end of the second course of the sequence.

Although the *D* grade represents low pass, in Trinity College not more than two courses passed with *D* grades may be counted among those required for year-to-year continuation or among the thirty-four courses required for graduation. Courses for which a *D* grade is earned, however, satisfy other requirements. For information on repeating a course with a *D* grade, see the section on course load and eligibility for courses in the chapter.

Failing Grades. A grade of *F* or *U* (see pass/fail option below) indicates that the student has failed the course. The grade is recorded on the student’s record. If the student

registers for the course again, a second entry of the course and the new grade earned are made on the record, but the first entry is not removed.

Pass/Fail Option. With the consent of the instructor and faculty advisor, a student who has declared a major may register for grading on a pass/fail basis in one elective, nonmajor course each term. No degree requirements, except the requirement for thirty-four course credits and the continuation requirements, may be met by a course passed under the pass/fail option, unless the course is offered only on that basis. Preceptorials, discussion sections, seminars, and tutorials may not be taken on the pass/fail basis, unless the course is offered only on that basis.

After the drop/add period in any term, no changes from pass/fail to regular status, or from regular to pass/fail status, are permitted in any course. A *P* may not be converted subsequently to a regular letter grade, and the course may not be retaken under the regular grading system.

Grades When Absent from Final Examination. See the section on final examination and excused absences in this chapter.

Grades for Incomplete Work. See the section on incomplete work in this chapter.

WP, WF, and W Grades, and WE Designation. *WP* and *WF* grades may be issued if a student withdraws from a course after the drop/add period. (See the sections on course changes in this chapter.) *W* grades are issued if a student withdraws from the university before the last four weeks of regular classes in the fall or spring semester, or before the last two weeks of classes in a regular summer term. (See the section on withdrawal and readmission in this chapter.)

WE indicates correction of an error in registration. It is not a grade.

Academic Recognition and Honors

In determining a student's eligibility for annual recognition and graduation honors, the colleges consider only grades earned in Duke courses, including courses taken in the university's own study abroad programs and under the interinstitutional agreement.

Annual Recognition. In acknowledgment of high academic achievement, recognition is given each summer to freshmen, sophomores, juniors, and seniors if the following requirements are met:

1. A normal academic load has been carried in the fall and spring terms.
2. Grades other than *P* have been earned in six semester courses.
3. No incomplete or failing grade has been received during the fall and spring terms.

The *Dean's List* recognizes students who earn a 3.3 average on all work in both the fall and spring terms. The *Dean's List with Distinction* includes students who earn a 3.6 average on all work in both the fall and spring terms of an academic year.

Graduation Recognition. Academic excellence at graduation has been recognized at Duke at the departmental level by graduation with distinction in a disciplinary or interdisciplinary program and at the college level by Latin honors. These traditional forms of recognition continue. Beginning with students who entered Duke as freshmen in the summer or fall of 1988, a third form of recognition is available which combines features of both graduation with distinction and Latin honors—the honors project.

Graduation with Distinction. Academic departments and interdisciplinary programs of the colleges have programs leading to graduation with distinction. While these programs may vary in specific details, all have common basic features and all have been approved by the Honors Committee of the Arts and Sciences Council. To be eligible to begin a program leading to graduation with distinction, a student must show promise of achieving by the time of graduation at least a *B* average in the major field. In addition, departments may have special requirements regarding standards of performance. In the

School of Engineering, for example, some departments require at least a *B* average in all subjects and may have other requirements.

Departments or interdepartmental honors committees may invite a student at the end of the sophomore or junior year to enter the Graduation with Distinction Program. The student typically participates in a seminar in the junior or senior year and/or a directed course of reading, laboratory research, or other independent study. The student must eventually present the results of individual research and study in a piece of writing judged by a departmental committee to be distinguished. The student's achievement, including the paper, is assessed by a faculty committee, and if the student has at least a *B* average in the major field, the committee may recommend that the student be graduated with distinction in the major field. A student engaged in an interdisciplinary program, including Program II, must attain an overall *B* average for courses taken in the departmental area of concentration or special study; achievement is assessed by an interdepartmental honors committee established by the directors of undergraduate studies in the departments concerned. A student may also be graduated with distinction in a program of studies that does not offer a major. In such a program the student must present a *B+* grade point average in the program field and a *B* average in all subjects. The papers of students in special programs will be evaluated by a committee drawn from the faculty within those programs. Interested students should consult appropriate directors of undergraduate studies or program directors.

Latin Honors by Overall Academic Record. Overall academic excellence over the entire college career traditionally has been recognized by the designations *cum laude*, *magna cum laude*, and *summa cum laude*. At Duke students who earn the following averages for approved course work are graduated with honors: 3.4, *cum laude*; 3.7, *magna cum laude*; 3.9, *summa cum laude*.

Latin Honors by Honors Project. Latin honors may also be awarded by Trinity College to students who successfully complete an honors project in an individual department. Honors projects must be approved by departmental faculty at successive stages during a student's junior and senior years. A candidate for Trinity College honors by honors project must have an overall grade point average of 3.3 at the beginning and end of the project to qualify for departmental nomination. Departmental procedures governing honors projects and the nomination of students for Latin honors by honors project must be approved in advance by the Honors Committee of the Arts and Sciences Council.

Other Honors. Elections to the national freshman honorary society, Phi Eta Sigma, are made at the end of the fall and spring semesters. Students who earn a 3.5 average in four or more semester courses in their first semester of enrollment, or those whose cumulative average at the end of their second semester is 3.5 or above in a program of eight or more semester courses, are invited to membership.

Elections of undergraduate students in Trinity College and the School of Engineering to membership in the national honor society, Phi Beta Kappa, are held in the spring and fall. A review of the academic record of all prospective candidates is conducted in the junior and senior years as well as in the term following graduation. (Doctoral students, on the other hand, are nominated by their department.) Eligibility for election is determined not by the university, but by the local chapter of the society. No less than four-fifths of earned credits must have been taken on the regular grading system (*A-F*). The total number of persons elected annually is limited by bylaw to 10 percent of the graduating class. Eligibility requires a course of study with the breadth that characterizes a liberal education. The Program I curriculum meets those expectations; Program II and Engineering students must demonstrate comparable breadth in order to be eligible. Inquiries concerning distribution requirements for students in the School of Engineering should be directed to Professor Rhett George, Department of Electrical Engineering. All other inquiries may be directed to the Secretary of Phi Beta Kappa, Box 4795, Duke Station, Durham, North Carolina 27706.

Membership to the national academic honors organization, the Golden Key National Honor Society, is by invitation to the top 15 percent of university juniors and seniors in all fields of study. Chapter activities are service and interaction oriented, and members are encouraged to be active participants. Scholarships are awarded annually and career assistance is provided.

Elections to the national engineering honor society, Tau Beta Pi, are held in the fall and spring. Eligibility is determined on the basis of distinguished scholarship and exemplary character. Engineering students whose academic standing is in the upper eighth of the junior class or the upper fifth of the senior class have earned consideration by their local chapter. Inquiries may be directed to the Advisory Board, Tau Beta Pi, School of Engineering, Duke University, Durham, North Carolina 27706.

International Fellowships. Students interested in various prestigious fellowships for graduate study (for example, the Fulbright-Hays, Luce, Marshall, Rhodes, and Winston Churchill) should consult the academic dean in charge of fellowships, 04 Allen Building. Specific information about deadlines and procedures is available through that office.

Notification of Intention to Graduate

The Diploma Card for students in Trinity College of Arts and Sciences and the School of Engineering is official notification that they expect to have completed all requirements for the degree and to receive the diploma on a particular graduation date. It is the responsibility of students to file the card on or before established deadlines. For students in Trinity College, the cards, to be filed during the fall registration period, are available in the college recorder's office; in the School of Engineering, the dean's office.

Commencement

Graduation exercises are held once a year in May when degrees are conferred upon and diplomas are issued to those who have completed degree requirements by the end of the spring term. Those who complete the requirements by the end of the summer term or by the end of the fall term receive diplomas dated September 1 or December 30, respectively. There is a delay of one month to two months in the mailing of September and December diplomas because diplomas cannot be issued until they are approved by the Academic Council and the Board of Trustees.

Prizes and Awards

The achievements of undergraduate students are recognized in various fields of activity. The following prizes suggest the range of recognition. According to current university policy, some of the scholarships listed must be awarded in honorary form unless the students chosen are on financial aid, in which case the scholarships will be incorporated in the winners' financial packages. These scholarships are identified by an asterisk (*).

The Edward H. Benenson Awards in the Arts. These awards of \$300 to \$3,000 are granted annually through the generosity of Duke alumnus and trustee Edward H. Benenson. Funds are awarded for fees, equipment, supplies, travel, production, and other educational expenses for projects in art, music, drama, dance, creative writing, and film/video proposed by undergraduates and graduating seniors of Trinity College and the School of Engineering. Application forms and instructions are available in February from the Institute of the Arts, 109 Bivins Building.

The Louis Sudler Prize in the Arts. An award is presented annually by the Institute of the Arts to a graduating senior who, in the opinion of a special institute committee, has demonstrated the most outstanding achievement in artistic performance or creation. The prize of \$1,000 was established in 1983 through the generosity of Louis C. Sudler, Chicago, Illinois.

The Sirena WuDunn Memorial Scholarship Fund. This fund was created by the family and friends of Sirena WuDunn. An award is made annually to a student who best embodies Sirena's ideals and interests and who has demonstrated academic excellence and an interest in Asian culture.

The Edward C. Horn Memorial Prize for Excellence in Biology. Given each year to a graduating biology major who has shown, in the opinion of the zoology faculty, the highest level of academic achievement and promise, this prize is offered in memory of Professor Edward C. Horn. It is a tribute to his warm regard for students and faculty and his appreciation of scholarly excellence. The prize consists of books appropriate to the student's field of interest.

CRC Outstanding Freshman Chemistry Award. A copy of the Chemical Rubber Company's *Handbook of Chemistry and Physics* is awarded annually to a freshman student in chemistry. The basis for selection by a faculty committee is academic excellence.

American Chemical Society Undergraduate Award in Analytical Chemistry. This prize is given annually by the Analytical Division of the American Chemical Society to an undergraduate student in analytical chemistry. The basis for selection is academic excellence and laboratory proficiency. The prize is a subscription to the journal *Analytical Chemistry* published by the American Chemical Society.

North Carolina Institute of Chemists Award. This prize is awarded annually to a graduating senior who has demonstrated a record of leadership and scholastic achievement and who has shown potential for advancement of the chemical and chemical engineering profession.

The Chemistry Department Award. This prize is awarded annually to an outstanding senior chemistry major in the Bachelor of Science degree program. The basis for selection is the student's independent research and interest in pursuing advanced work in chemistry. The prize is a one-year subscription to an appropriate journal.

The Merck Index Award. This prize is awarded annually to one or more graduating chemistry majors intending to pursue a career in medicine. Selection, by a faculty committee, is based on scholastic excellence. The prize consists of a copy of the *Merck Index* presented by Merck and Co., Inc.

The David Taggart Clark Prize in Classical Studies. This prize derives from income earned on the generous bequest (1956) of Professor David Taggart Clark, classicist and economist. It is awarded to the senior major in Greek, Latin, or Classical Studies who is judged to have written the best honors essay of the year, and consists of an important book or books in the field of classics.

The James B. Rast Memorial Award in Comparative Anatomy. The parents and friends of James Brailsford Rast, a member of the Class of 1958 of Duke University, endowed this award in his memory. The award, consisting of the *Atlas of Descriptive Human Anatomy* by Sobotta and bearing the James B. Rast Memorial bookplate, is given annually to the student who demonstrates the greatest achievement in the study of comparative anatomy.

John M. Clum Distinguished Drama Graduate Award. Named for the distinguished founder of Duke Drama, this award recognizes an outstanding graduating senior who has made extraordinary contribution to the life of the program, and who has exhibited the outstanding personal and professional qualities that mark Professor Clum.

The Reynolds Price Award for Script-writing. This award is presented annually by the Drama Program to a Duke undergraduate for the best original script for stage, screen, or television.

The Winfred Quinton Holton Prize in Primary Education. This prize was established in 1922 by gifts of Holland Holton, Class of 1907, and Lela Young Holton, Class of 1907, in memory of their son, Winfred Quinton Holton, with the income to be used to provide a prize for investigative work in primary education. This prize may be made annually. Competition is open to Duke seniors and graduate students who are eligible to obtain certification to teach. A student who wishes to be considered for the prize must submit a paper to be judged by a faculty committee in the Program in Education.

The Robert J. Niess/Alexander Hull Award in French. Given each year to an outstanding French major in honor of Robert J. Niess, professor of French at Duke University from 1972 to 1981 and Alexander Hull, associate professor of French at Duke University from 1962 to 1993.

The William T. Laprade Prize in History. This prize is offered in honor of William T. Laprade, who was a member of the Department of History at Trinity College and Duke University from 1909 to 1953, and chairman of the department from 1938 to 1952. It is awarded to a senior who is being graduated with distinction and whose senior essay in history has been judged to be unusually meritorious.

The Bascom Headen Palmer Literary Prize. This prize was established in honor of Bascom Headen Palmer's achievement as recipient of the Hesperian Literary Society Medal in 1875, his senior year in Trinity College. It recognizes the best senior honors thesis in literary study each year.

Julia Dale Prize in Mathematics. This is an annual prize of at least \$200. The winner is selected by the Department of Mathematics on the basis of excellence in mathematics. In some years first and second prizes are given.

Karl Menger Award. This is an annual cash award. The winner is selected by the Department of Mathematics for outstanding performance in mathematical competitions.

The Henry Schuman Music Prize. A prize of \$350 is awarded annually to an undergraduate of Duke University for an original composition or a distinguished paper in music history or analysis. The award is sponsored by the Department of Music through a continuing gift from Dr. and Mrs. James H. Semans, who named the prize after Henry Schuman, a lifelong friend of the Semans and Trent families, a talented amateur violinist, and one who helped to build valued collections in the Duke library.

Giorgio Ciompi Scholarships. These music scholarships are given to students who can demonstrate talent and achievement on a string instrument. Although recipients are not required to major in music, they are required to study privately. These scholarships are at least \$500 and are renewable annually for up to four years as long as the student exhibits good performance and makes significant progress.

The Smith Memorial Scholarship. This scholarship of up to \$2,000, in memory of Marvin Boren and Elvira Lowe Smith, is awarded to an organist who is an undergraduate music major or a graduate student in performance practice. It is renewable as long as the recipient continues to study the organ and maintains satisfactory progress.

Keyboard Classics Magazine Scholarship. This music scholarship of up to \$1,000 is awarded on the basis of merit to an entering pianist. It is renewable annually as long as the recipient is registered for applied piano study and is making satisfactory progress.

Sheet Music Magazine Scholarships. Two music scholarships of \$750 each are offered annually to entering first-year instrumentalists on a competitive basis. Enrollment in applied music (in the principal instrument) and participation in a departmental ensemble are required. The awards are renewable for up to four years as long as these requirements are met and progress is satisfactory.

The Julia Wilkinson Mueller Prize for Excellence in Music. An award of \$300 will be presented to a graduating senior for achievement in musical performance.

Robert S. Rankin Political Science Awards

Award in American Government and Constitutional Law. An award to the outstanding student in the field of American government and constitutional law. A prize of at least \$150 is donated by a former student of Professor Rankin's, Judge Jerry B. Stone, A.B. '44, J.D. '48.

Award in American National, State, and Local Governments. An award to the outstanding student in the field of American national and/or state and/or local governments. A prize of at least \$100 is also donated by Judge Stone.

American Government Award for Leadership and Academic Achievement. One or more awards have been donated by Robert H. Connery, Professor Emeritus of Public Law and Government at Columbia University, and from 1949-65 a colleague of Professor Rankin's when both were members of the Duke faculty, and by a group of Professor Rankin's former students. These awards are given to students, chosen by the Department of Political Science, who have demonstrated excellence in the study of American government and whose past achievements and future promise manifests not only high intellectual attainments, but also an exemplary leadership role in service to Duke University or to the community as broadly defined.

Alona E. Evans Prize in International Law. An annual award to an undergraduate and/or graduate student in arts and sciences whose paper(s) on international law reflect(s) excellence in scholarship. Substantial money prizes are derived from income earned on the generous bequest of Professor Alona E. Evans, A.B. '40, Ph.D. (political science) '45.

Elizabeth G. Verville Award. An annual award to the undergraduate who submits the best paper in the subject matter of political science. Funds for the award of \$100 are derived from a gift by Elizabeth G. Verville, a political science major, A.B. '61.

The Marguerite (Mimi) Voorhees Kraemer Award. This annual award was created by the family and friends of Mimi Voorhees, a public policy studies major, class of 1979. It recognizes a PPS student who has demonstrated strong leadership qualities and a commitment to public service. This award is given to a junior as a scholarship to help defray the costs of participating in the summer internship program.

The Joel Fleishman Distinguished Scholar Award. This award is presented annually by the Sanford Institute of Public Policy, recognizing the graduating major with the highest academic achievement in public policy.

The Terry Sanford Departmental Award. This award is presented annually by the Sanford Institute of Public Policy to the graduating major recognizing his/her achievement in leadership.

The Karl E. Zener Award for Outstanding Performance of a Major in Psychology. The Karl E. Zener Award is given to a psychology major who has shown outstanding performance and scholarship. The award, based on the student's total grade record and a paper submitted to the award committee, consists of a monetary prize and inclusion by name on a memorial plaque in Zener Auditorium.

Chester P. Middleworth Awards. These awards were established to encourage and recognize excellence in research and writing by Duke students in their use of primary source materials held by the Special Collections Library. Two cash awards are made annually to undergraduates through the Special Collections Library, which is housed within Perkins Library.

The Richard L. Predmore Award in Spanish. Given each year to an outstanding Spanish major in honor of Richard L. Predmore, professor of Spanish at Duke University from 1950-1978 and dean of the Graduate School from 1962-1969.

The William Senhauser Prize. Given by the mother of William Senhauser in memory of her son, a member of the Class of 1942, who gave his life in the Pacific theater of war on August 4, 1944. This award is made annually to the student in Trinity College of Arts and Sciences or the School of Engineering who has made the greatest contribution to the University through participation and leadership in intramural sports. The winner of this prize is chosen by a committee appointed by the president of the university.

Kevin Deford Gorter Memorial Endowment Fund. This fund was created by the family of Kevin Deford Gorter to assist, promote, and expand the Sport Clubs program at Duke University. An award is made annually to the student who has made the greatest contribution to the program and best exemplifies the purposes of Sport Clubs at Duke University.

***The William M. Blackburn Scholarship.** This fund was established in 1962 to honor William Blackburn, distinguished teacher of writing at Duke. The scholarship, awarded by the Department of English, recognizes outstanding achievement in the field of creative writing.

The Anne Flexner Memorial Award for Creative Writing. This award was established by the family and friends of Anne Flexner, who graduated from Duke in 1945. Open to all Duke undergraduates, the competition for prose fiction (5,000-word limit) and poetry (200-line limit) is sponsored in the spring semester by the Department of English. Entries are judged by the department's Committee on Creative Writing; awards range from \$200 to \$500.

The Rudolph William Rosati Fund. Established in 1978 by Mr. W. M. Upchurch, Jr., this fund honors the memory of his friend, the late Mr. Rosati, a talented writer. Awards are given to encourage, advance, and reward creative writing among undergraduate students. A committee named by the provost oversees the program and distribution of the fund.

***The Margaret Rose Knight Sanford Scholarship.** This fund was established in recognition of the untiring efforts of Margaret Rose Knight Sanford on behalf of Duke University. The scholarship is awarded to a female student who demonstrates particular promise in creative writing. Awards are made by the Department of English.

***The Francis Pemberton Scholarship.** This award was created by the trustees of the Mary Duke Biddle Foundation in memory and in honor of Francis Pemberton's service to the Biddle Foundation. The scholarship is awarded by the Department of English to a junior or senior pursuing the study of creative writing.

***The E. Blake Byrne Scholarship.** This fund was created in 1986 by E. Blake Byrne (Trinity College, Class of 1957). The award is made by the Department of English to rising juniors with demonstrated talent in creative writing.

The Raymond D. Lublin, M.D. Premedical Award. This award to an outstanding graduating senior who will be attending medical school and who has excelled in both science and non-science areas of the curriculum was established in the name of an honored physician and surgeon by his wife, Mrs. Raymond D. Lublin.

The Walter J. Seeley Scholastic Award. This award is presented annually by the Engineers' Student Government to that member of the graduating class of the school who has achieved the highest scholastic average in all subjects, and who has shown diligence in pursuit of an engineering education. The award was initiated to honor the spirit of academic excellence and professional diligence demonstrated by the

late Dean Emeritus Walter J. Seeley. It is hoped that this award will serve as a symbol of the man and the ideals for which he stood. The name of the recipient is inscribed on a plaque displayed in the Engineering Building.

The American Society of Civil Engineers Prize. The prize is awarded annually by the North Carolina Chapter of the American Society of Civil Engineers to two outstanding civil engineering seniors, upon recommendation of the faculty of the civil engineering department. The basis for selection is the student's scholastic record, contribution to the student chapter, and participation in other college activities and organizations. The prize consists of a certificate of award and the payment of one year's dues in the American Society of Civil Engineers.

The George Sherrerd III Memorial Award in Electrical Engineering. This award is presented annually to the senior in electrical engineering who, in the opinion of the electrical engineering faculty, has attained the highest level of scholastic achievement in all subjects and has rendered significant service to the School of Engineering and the University at large. The award was established in 1958 by the parents of George Sherrerd III, a graduate of the Class of 1955, to recognize outstanding undergraduate scholarship. Recipients receive a monetary award, and their names are inscribed on a plaque displayed in the Engineering Building.

The Charles Ernest Seager Memorial Award. This award recognizes outstanding achievement in the annual Student Prize Paper Contest of the Duke branch of the Institute of Electrical and Electronics Engineers or significant contributions to electrical engineering. The award, established in 1958 by the widow and friends of Charles Ernest Seager, a graduate of the Class of 1955, consists of inscribing the name of the contest winner on a plaque displayed in the Engineering Building.

The Milmo Prize. This prize is awarded annually to students from North or South Carolina graduating in the Department of Electrical Engineering, who, in the opinion of the faculty of that department, and, as shown by their grades, have made the most progress in electrical engineering during the last year in school. The prize consists of a certificate of award and one year's payment of dues in the Institute of Electrical and Electronics Engineers for the membership year in which the honoree is awarded the baccalaureate degree.

The Raymond C. Gaugler Award in Materials Science and Engineering. This award is presented annually to the senior who has made the most progress at Duke in developing competence in materials science or materials engineering. The basis for selection is the student's scholastic record, research, or design projects completed at Duke, and interest in a materials-related career. The award has been established by Patricia S. Pearsall in memory of her grandfather, Raymond C. Gaugler, who was president of the American Cyanamid Company prior to his death in 1952.

The American Society of Mechanical Engineers Award. This award is presented annually to a senior in mechanical engineering for outstanding efforts and accomplishments in behalf of the American Society of Mechanical Engineers Student Section at Duke. The award consists of a certificate of recognition.

The School of Engineering Student Service Award. This award, established in 1978, is given to those graduating seniors who, by their contributions of time, effort, and spirit, have significantly benefited the community of the School of Engineering. The names of the recipients are inscribed on a plaque displayed in the Engineering Building.

The T.C. Heyward Scholarship Award. This award is presented annually to an outstanding senior in mechanical engineering at Duke University. The recipient is chosen by a committee of the mechanical engineering faculty and selection is based on academic excellence, engineering ability, and leadership. The recipient receives a monetary award and his or her name is inscribed on a plaque displayed in the Engineering Building.

The William Brewster Snow Award in Environmental Engineering. This award is presented to an outstanding senior in civil engineering who, through superior academic achievement and extracurricular activities, has demonstrated interest and commitment to environmental engineering as a career. Selection of the recipient is made by the civil engineering faculty. The recipient is presented with an inscribed plaque and his or her name is also inscribed on a plaque permanently displayed in the Engineering Building.

The Otto Meier, Jr. Tau Beta Pi Award. This award was established in recognition of Dr. Meier's leadership in establishing the North Carolina Gamma Chapter in 1948 and his continuous service as chapter advisor until 1975. This award is given annually to the graduating Tau Beta Pi member who symbolizes best the distinguished scholarship and exemplary character required for membership. The name of the recipient is inscribed on a plaque displayed in the Engineering Building.

The da Vinci Award. This award is presented by a faculty committee of the Department of Biomedical Engineering to the biomedical engineering senior with the most outstanding academic record. This award commemorates the contributions of Leonardo da Vinci in laying the foundations for the study of biomechanics.

The von Helmholtz Award. This award is presented by a faculty committee of the Department of Biomedical Engineering to the biomedical engineering senior who has made the most outstanding contribution to the department. This award commemorates the work of von Helmholtz in laying the foundations of biomedical engineering.

Aubrey E. Palmer Award. This award, established in 1980, is presented annually by the faculty of the Department of Civil and Environmental Engineering to a civil engineering senior in recognition of outstanding academic achievement. The award consists of a certificate of recognition and the name of the recipient inscribed on a plaque displayed in the Engineering Building.

The Mechanical Engineering and Materials Science Faculty Award. This award is presented annually in recognition of academic excellence to the graduating mechanical engineering senior who has attained the highest level of scholastic achievement in all subjects. The name of the recipient is inscribed on a plaque displayed in the Engineering Building.

Education Records

Duke University adheres to a policy permitting students access to their education records and certain confidential financial information. Students may request review of any information which is contained in their education records and may, using appropriate procedures, challenge the content of these records. An explanation of the complete policy on education records may be obtained from the registrar's office.

No information, except directory information (see below), contained in any student records is released to persons outside the university or to unauthorized persons on the campus, without the written consent of the student. It is the responsibility of the student to provide the Office of the Registrar and other university offices, as appropriate, with the necessary specific authorization and consent.

Directory information includes name, addresses, telephone listing, photograph, major field of study, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees and awards received, and most recent previous educational institution attended. This information may be released to appear in public documents and may otherwise be disclosed without student consent unless a written request not to release this information is filed in the Office of the Registrar by the end of the first week of classes each term.

Special Study Centers, Programs, and Opportunities



Campus Centers and Institutes

CENTER FOR INTERNATIONAL STUDIES

The university's Center for International Studies promotes, coordinates, and supports a wide array of research and teaching activities on international issues in Arts and Sciences and the professional schools. Faculty associated with the center come from diverse disciplines and reflect a wide range of intellectual interests. Their primary bond is a concern with peoples, events, movements, and institutions outside the United States; relations among nations; and activities and institutions in the United States that affect the rest of the world. The center fosters the belief that comparative knowledge and understanding of other cultures and societies are essential for an appreciation of the world in which we live and deserve primary emphasis in teaching and research in the university.

The functions of the center are to provide focus, structure, and support to the research efforts of associated scholars and to serve as a catalyst for the coordination of varied research undertakings. It also assists in dissemination of these undertakings and fosters international activities in educational, research, and governmental institutions in the southeastern United States.

The Center for International Studies is involved in monitoring and initiating change in the international curricula of the undergraduate, graduate, and professional schools of the university. It has a special interest in undergraduate education and, through a variety of programs and activities, makes a contribution to the undergraduate academic experience. It seeks to attract students to the wide range of international and comparative courses available, and it offers awards to rising sophomores for summer travel and research overseas. In recognition of the excellence of its programs, Duke's Center for International Studies has been designated a National Resource Undergraduate Center in International Studies by the U.S. Department of Education.

The Comparative Area Studies major allows students to concentrate their studies on Africa, East Asia, Eastern Europe, Latin America, the Middle East, North America, Russia, South Asia, or Western Europe. (See the chapter "Courses of Instruction.")

Students are encouraged to pursue study abroad opportunities as well as language study in non-Western and Western languages.

Area studies function in centers, institutes, or programs in the following areas:

African Studies. This program brings together faculty with a common interest in problems of the African continent. It encourages course work and lectures in African studies. Associated faculty work closely with students concentrating on Africa in the major in comparative area studies.

Asian/Pacific Studies. This program, administered by the Asian/Pacific Studies Institute, supports and encourages Asian and Pacific studies with special emphasis on Japan and China. Courses offered cover a range of disciplines including Japanese, Chinese, Korean, anthropology, economics, art, history, political science, music, and religion. The institute provides support for visiting lecturers and conferences and makes available a limited number of fellowships annually. Study abroad opportunities are available in China and Japan. An East Asia concentration is possible for majors in comparative area studies.

Canadian Studies. The Canadian Studies Center administers the Canadian Studies Program, which offers courses introducing students to various aspects of Canadian life and culture. Courses and lectures in a wide range of disciplines in the humanities and the social sciences are designed to increase students' knowledge and understanding of Canada. Special emphasis is placed on Canadian problems and comparisons of Canadian and American perspectives. Concentrations in Canadian studies are described in the chapter "Courses of Instruction." Study abroad opportunities are available.

Caribbean Studies. The Caribbean Studies Committee focuses its activities on the problems and issues common to the various societies in this culturally diverse region. The committee views the Caribbean region as an ideal laboratory for analysis of issues such as colonialism, race relations, and development problems. The program works closely with the Council on Latin American Studies to serve the needs of students with an interest in this area.

Comparative Islamic Studies. This program focuses on the entire Muslim world from North Africa to Southeast Asia. Course offerings include an interdisciplinary undergraduate survey of Islamic civilization and courses in Islamic history and religion. The program offers several levels of Arabic language and literature as well as Persian, Hindi/Urdu, and Swahili. It also sponsors lectures, conferences, and film series on aspects of Islamic culture and a summer program in Morocco.

Latin American Studies. The Council on Latin American Studies administers a comprehensive program in Latin American studies. A wide range of courses in the humanities, the social sciences, Portuguese, and Spanish is offered. Visiting professors and lecturers from Latin America, a speakers series, conferences, and summer programs abroad are supported by the program. Faculty associated with the program work closely with students majoring in comparative area studies who concentrate in Latin America.

In addition, the Council and the Institute of Latin American Studies at Chapel Hill sponsor the Duke-University of North Carolina Program in Latin American Studies that includes yearly faculty exchanges of two faculty members from each institution, pre-dissertation awards for travel in Latin America, joint undergraduate and graduate student seminars, graduate student colloquia, and faculty-student research working groups.

Slavic, Eurasian, and East European Studies. This committee coordinates interdisciplinary efforts primarily in the fields of Russian (including Soviet) and East European history, economics, political science, literature, linguistics and language training. Lan-

guage instruction in Russian, Polish, and Ukrainian is available. The committee also sponsors visiting lectures, conferences, symposia, and films.

South Asian Studies. The South Asian Program combines scholars from Arts and Sciences and the professional schools whose research deals with the societies and cultures of the Indian subcontinent. The program offers courses in Hindi-Urdu, an introductory course on the civilizations of the Indian subcontinent, and topical courses presenting a wide-ranging view of the past and present of the Indian subcontinent. Majors in comparative area studies may elect a South Asian concentration. The program also helps sponsor cultural events put on by the Duke University South Asian Students Association.

West European Studies. Faculty associated with this program promote comparative research, graduate training, and teaching activities concerned with historical and contemporary European issues. Attracting a large number of undergraduate comparative area studies majors, this popular program regularly sponsors campus-wide events, such as conferences on contemporary trends in European politics and society and recent developments in the European Community. The committee is currently spearheading an effort to establish a Center for European Studies which will be jointly sponsored with a similar committee at the University of North Carolina at Chapel Hill.

In addition, the center promotes interdisciplinary research and teaching around thematic issues. Thematic interdisciplinary committees in 1994-95 include

Citizenship and Civil Society. This interdisciplinary committee, which includes faculty from sociology, political science, history, and philosophy, focuses on the political and public construction of rights and duties in society. The examination of citizenship brings into focus the newly emerging concerns of rights, obligations, and personhood; and the study of civil society examines how the web of associations operates in the public sphere to protect, promote, and change political and economic democracy. The main areas of empirical interest are the emerging democracies of Europe and the changing welfare state in advanced industrialized countries. The group sponsors a monthly reading seminar and talks throughout the year.

Comparative Labor Studies. This committee brings together historians, sociologists, political scientists, and other faculty members at Duke with interests in labor and the working class. The committee in particular promotes scholarship and teaching dealing with the comparative study and history of labor in different nations.

Ethnicity and Nationalism. This committee is intended to stimulate research and teaching interest at Duke and in the Triangle area on comparative aspects of nationalism and inter-ethnic relations in various parts of the world, particularly, but not exclusively, in Eastern Europe and the former U.S.S.R. The committee's primary activity is a monthly interdisciplinary faculty seminar, open to a limited number of graduate students interested in dissertation research on the topic. The seminar includes presentations from faculty at Duke, UNC-Chapel Hill, North Carolina State University, and other area scholars, as well as outside guest speakers. The committee has several other projects: collection of relevant course syllabi, publication of a series of working papers, and a major conference.

Gender in International Perspective. This interdisciplinary, cross-cultural committee brings together scholars at Duke who are interested in, or have already incorporated into their scholarship, a gender component. It also invites international scholars to the campus. Recently, the committee has devoted considerable time and effort to establishing a study group focused on the intersections of war and gender. In August 1993 this subgroup convened an international conference at the Rockefeller Center in Bellagio, Italy, which aimed to develop a dialogue between feminists and military scholars.

Hemispheric Studies. This program brings together faculty whose research interrelates U.S., Canadian, and Latin American studies. It is currently sponsoring a long-term interdisciplinary research project on the social, political, and cultural implications of North American economic integration.

Psychological Engineering in the Early Soviet Union. One of the traditional beliefs now undergoing reevaluation in the post-Cold War era is the role played by the Russian avant-garde in this experiment. Instead of being seen as "betrayed" by Stalin's "second revolution" of 1929-31, the generation of avant-garde artists, writers, and theorists of the 1910s and 1920s is now attributed a role of direct responsibility in the making of Stalinist "total culture" and the molding of the "new man." An interdisciplinary group of Duke faculty members has decided to contribute to this debate by scrutinizing the problem of "psycho-engineering" in light of their specialties and the opening of the former Soviet archives.

CENTER FOR RESEARCH ON WOMEN (Duke-UNC Chapel Hill)

The Duke-UNC Center for Research on Women was founded in 1982 as a collaborative endeavor between Duke University and the University of North Carolina (Chapel Hill) to promote women's studies scholarship and research; to support curriculum development in women's studies; and to disseminate women's studies research and information throughout the South. The center principally seeks to explore the dynamics of gender, race, and class, with a particular emphasis on the American South.

Its regular activities include a working paper series, a biannual newsletter, publications, and the sponsorship of conferences, colloquia, and community events. Students seeking information should inquire at 338 Carr Building (Duke), (919) 684-6641 or at 03 Caldwell Hall 009A (University of North Carolina, Chapel Hill), (919) 966-5787.

CENTER FOR DOCUMENTARY STUDIES

This interdisciplinary center for research, teaching, and the dissemination of documentary studies is dedicated to encouraging and supporting the work of photographers, filmmakers, historians, journalists, novelists, and others who work by direct observation and participation in the lives of individuals and communities. The center is currently focusing on four areas of research: the American family, African American life and race relations, law and politics, and ecology and the environment. A variety of center sponsored projects offer a limited number of assistantships to graduate students in the arts and humanities. The center also offers courses under the auspices of several Duke departments including history, public policy studies, education, and English. For more information consult Iris Tillman Hill, Director, Center for Documentary Studies, Lyndhurst House, 1317 West Pettigrew Street, Box 90802, Durham, North Carolina 27708-0802.

CONTINUING EDUCATION

Academic Study. Local adult residents are encouraged to pursue academic study at Duke (1) as potential degree candidates, for those who have not been full-time college students for at least four years and are now resuming or beginning a bachelor's degree; (2) as nondegree students, for those with baccalaureates who now seek a sequence of undergraduate credit courses; and (3) as students completing the last year of work towards a degree at another institution. These students are given academic counseling by the Office of Continuing Education and University Summer Programs and are subject to most of the regulations set forth for degree candidates. Continuing education applications may be obtained from the Office of Undergraduate Admissions and must be returned to that office, accompanied by a \$35 application fee, by August 1 for the fall semester and by December 1 for the spring semester.

Career Development Services. Career Development Services assists persons making decisions about returning to work, re-entering school, career planning and assessment, life/work transitions, and individual goal setting. Individual appointments, group sessions, and workshops are held.

Short Courses and Conferences. Short courses (noncredit) in the liberal arts are offered regularly throughout the year for those interested in personal enrichment or career advancement. Conferences, institutes, and training programs are conducted during the academic year and in the summer. Some are residential and others are designed for local participants. Some award continuing education units.

The Institute for Learning in Retirement. The institute is for persons over fifty years of age who recognize in themselves a need to continue learning and sharing knowledge.

For brochures on each program and for fuller information, write or call the Office of Continuing Education and University Summer Programs, The Bishop's House, East Campus, (919) 684-6259.

INSTITUTE OF THE ARTS

The Institute of the Arts is a center for the interdisciplinary presentation, support, production, and study of the arts. The institute coordinates artist residencies on campus and in the community, presents series in contemporary performance, world music/dance, and modern dance. Working with a representative faculty council, the institute coordinates and supports new curricular initiatives in the arts and works to develop cooperative programs between Duke and the surrounding community. An undergraduate certificate program in the arts is offered as well as a one-semester, off-campus residency program, Duke in New York Arts. The institute is also the administrative home for the Duke Dance Program. It provides support for student and faculty projects in the arts and administers awards and prizes. For further information, inquiries should be made to Duke University Institute of the Arts, 109 Bivins Building, Box 90685, (919) 684-6654.

INSTITUTE OF STATISTICS AND DECISION SCIENCES

The Institute of Statistics and Decision Sciences was founded in 1985 to conduct and coordinate teaching and research in statistics and the application of quantitative methods to the study of decision making. The institute offers a wide range of course work and consultation in mathematical statistics, statistical modeling, applied statistics, statistical computing, decision analysis, and utility theory. Students interested in the activities of the institute should consult the institute office, 333 Old Chemistry Building, (919) 684-4210.

Specialized Programs Within Academic Units

Through the programs described below, students have the opportunity to engage in the specialized study of an area without the concentration required of a major. These programs, supplements to the basic course of study, usually reach beyond departmental boundaries and generally provide an interdisciplinary focus to the subject matter. If completed, many offer official recognition of participation, often in the form of a certificate. More information may be obtained from the directors of the programs.

AFRICAN AND AFRO-AMERICAN STUDIES

The Program in African and Afro-American Studies offers a certificate program to students desiring a focused study of the experience of peoples of African ancestry in a variety of contexts, including, but not limited to, Africa and the Americas. Students interested in more detailed study may choose to do a major in the field. Additional

information about the certificate program is given in the chapter "Courses of Instruction" in this bulletin.

ASIAN AND AFRICAN LANGUAGES AND LITERATURE

Established in 1988, the Program in Asian and African Languages and Literature (AALL) offers courses in the languages, literatures, and cultures of more than two thirds of the world's population. These languages include Arabic, Chinese, Hebrew, Hindi, Japanese, Korean, Persian, and Swahili. To qualify for the certificate in AALL, students must take two years of introductory and intermediate language instruction, a core course, and four other courses taken from AALL listings. Full details concerning the program and its courses can be obtained by writing or calling the director, Professor Jing Wang, Asian and African Languages and Literature, 2101 Campus Drive, 919-684-4309.

DANCE

The Dance Program offers its students the opportunity to study modern dance, ballet, dance history, choreography, repertory, and non-Western dance forms in an environment that challenges the student's intellectual, expressive, and physical capabilities. A balanced integration between the creative/performance and the historical/theoretical aspects of dance is emphasized. Academic courses in dance provide a historical and theoretical foundation for the student's creative work. In turn, the student's participation in dance creation and performance, and the development of technical skill, deepen the student's scholarly appreciation of the medium. With this approach the aim of the program is to develop students who are sensitive physical communicators of the visual art of dance and who are articulate spokespeople for the art form.

The program offers courses in technique, performance, and theory. A certificate is available to students who meet the requirements for it, as described in the Courses of Instruction section of this bulletin. Students are urged to enroll in at least one summer session with the American Dance Festival. If appropriate to the student's specific course of study, one course credit earned at the American Dance Festival may be counted toward the certificate requirements. Through the Duke in New York Arts Program, a student has the opportunity in the fall semester of the junior or senior year to pursue the study of dance in New York City; appropriate courses taken at New York University may fulfill certificate requirements.

FILM AND VIDEO

The Program in Film and Video introduces students to the critical analysis of new communications technologies: film, photography, and television. Practical experience in 16mm film and videotape production is also available through course work and internships. Established in 1986, this program also sponsors speakers, film and video screenings, and exhibits under the rubric of Screen/Society. For further information, students should consult the program director, Professor Jane Gaines, 107A Art Museum, (919) 684-4130.

THE FOCUS PROGRAMS

The Focus Programs offers first-year students a number of programs in the fall semester, each featuring a cluster of courses with a common theme. Classes are small and provide the opportunity of discussion in courses intended to enrich each other. Each of the following programs includes a required half-course designed to emphasize the interdisciplinary nature of the program. It will meet once a week over dinner.

Twentieth-Century America. The Twentieth-Century America Program explores modern American society in a group of interrelated courses from the perspectives of

history, literature, sociology, religion, and political thought. The program offers five courses, of which participants must take at least three, including the University Writing Course.

This special program provides the student with the opportunities that come from relatively small classes (often of seminar format), a program of interrelated and mutually reinforcing courses, and close relationships with professors and stimulating fellow students.

Courses that the program has offered include University Writing Course (special section), History 93S, Sociology 101S, Political Science 144S, and Religion 114S (see descriptions in this bulletin). Further information and application forms may be obtained from the Premajor Advising Center.

Science, Technology, and Modern Culture. The purpose of this program is to explore important developments in the sciences in the twentieth century, their historical significance, and their sociocultural impact. Faculty in botany, zoology, chemistry, mathematics, physics, engineering as well as history, philosophy, sociology, English, and literature will from time to time offer seminars in this program. Four or five seminars in addition to specially designed sections of the University Writing Course (UWC) will be available. These seminars will be interrelated in content and limited in enrollment to no more than eighteen students in each seminar. In addition to UWC, students should select one non-science course and at least one science or mathematics course. Further information and application forms may be obtained from the Premajor Advising Center.

Medieval and Renaissance Studies. The Program in Medieval and Renaissance Studies focuses on European Medieval and Renaissance history and culture. Each year the program selects a pivotal century in Western Europe and approaches it from the perspectives of history, literature, and art. The group of courses is particularly valuable for students interested in understanding the cultural roots and continuities of Western society.

All students in the Medieval and Renaissance Studies Focus Program elect University Writing Course 7 and at least two additional seminars from the three offered. One evening each week, all program participants will meet for dinner and discussion in the half-credit course Interdisciplinary Course 105. Students are free to choose a fourth course, but it is strongly recommended that students consider either Latin, Greek, or a modern European language. Further information and application forms may be obtained from the Premajor Advising Center.

Evolution and Humankind. Students in this program will study the evolution of human beings and the diversity and similarity of human experience. Topics will range from studies of cognition and of such behaviors as aggression and altruism to issues of health, human development, aging, and equality of race and gender. Faculty in biological anthropology and anatomy, cultural anthropology, sociology, zoology, philosophy, religion, and psychology will offer seminars in this program. Four seminars interrelated in content will be offered and limited in enrollment to no more than eighteen students. Each student will select at least two seminars from the program, but may take three of the seminars. Further information and application forms may be obtained from the Premajor Advising Center.

Contemporary Global Culture. This program will explore the social, economic, political, and moral aspects of African, Asian, and Latin American cultures in a global context. Faculty in English, literature, religion, cultural anthropology, comparative area studies, history, and political science will from time to time offer seminars in this program. The program will also involve appropriate foreign language departments. Four seminars interrelated in content will be offered and limited in enrollment to no more than eighteen students in each seminar. Each student in the program will select at

least two seminars but may take three of the seminars. Further information and application forms may be obtained from the Premajor Advising Center.

HEALTH POLICY

Through its Center for Health Policy Research and Education, the university offers undergraduates a sequence of health policy courses whose successful completion will lead to a certificate. The certificate sequence in health policy culminates in an integrative group project. For further information, inquire at the Center for Health Policy Research and Education, Suite 125 Old Chemistry Building.

HUMAN DEVELOPMENT

This interdisciplinary program provides opportunities to compare and to explore the complementarity of disciplinary perspectives on the biological, biomedical, psychological, social, and cultural aspects of human development. The program, which is more fully described under "Courses of Instruction," integrates courses, a research apprenticeship, and special events through an active advisory procedure. For more information and a program brochure, consult Professor Robert J. Thompson, Jr., (919) 684-5072.

INTERDISCIPLINARY GERMAN STUDIES

The Interdisciplinary German Studies Program unites offerings from art and art history, Germanic languages and literature, history, music, philosophy, political science, religion, Slavic languages and literatures, and sociology. It offers a perspective on the world in so far as it has been shaped by individuals and societies who use the German language. Students in the program may earn a certificate by taking a prescribed group of courses outlined in the chapter "Courses of Instruction."

Students may also pursue this program in Germany while participating in a Duke-approved study abroad program during a summer or during their junior year. Duke offers its own summer program at the Friedrich Alexander University in Erlangen/Nürnberg and a spring and fall semester program at the Free University of Berlin. For further information consult the Director of the Program in Interdisciplinary German Studies, Department of Germanic Languages and Literature, 104 Languages Building, (919) 660-3160.

JUDAIC STUDIES

Duke University through the auspices of the Center for Judaic Studies offers a full range of courses in Judaic civilization. Participating departments and programs include religion, Germanic languages, Asian and African languages, comparative literature, history, political science, international studies, anthropology, and women's studies. Also, courses may be taken at nearby Chapel Hill where additional courses are offered under the rubric of the Joint Program in Judaic Studies. A full range of courses is available in classical and modern Hebrew as well as in Yiddish. Students desirous of further language training or specialization may elect to pursue their studies in Israel during their junior year at a Duke approved program.

The program in Judaic studies is largely focused on undergraduates who may earn a certificate in Judaic studies after taking any four nonlanguage courses, or who may pursue Judaic studies under Program II, the alternative program option. This option offers a student the flexibility to design, with the aid of a faculty advisor, a curriculum to accommodate unusual interests and talents. Some students may also choose to concentrate on Judaic studies within the context of a religion major; such students are also eligible to receive a certificate.

Duke regularly sponsors its own summer program in Israel and over 700 students have participated in it to date. For further information, inquire at the Center for Judaic Studies, Box 90964, Duke Station, Duke University, Durham, North Carolina 27708-0964.

MARKETS AND MANAGEMENT STUDIES

The Program in Markets and Management Studies is designed to meet the needs of undergraduates who wish to combine a liberal arts education with preparation for careers in business management, advertising, public relations, and retailing. Students choose from a wide range of courses in a number of departments in seeking to understand how business enterprises operate and how markets for goods, services, and labor are changing in an increasingly competitive global economy. Core courses, offered by the Department of Sociology, place a heavy emphasis on case studies of actual management and marketing problems and are intended to teach a broad range of analytical and practical skills.

A certificate is awarded on completion of the requirements for the program. Participants in the program are offered the chance to use film and video materials for extraclassroom discussion, have the use of a resource room, and can compete for research funds. The program also seeks to facilitate business internships for qualified students. For further information consult Professors Kenneth Spenner or John Wilson in the Department of Sociology.

NEUROSCIENCES

The Neurosciences Program reflects the rapid developments in our understanding of brain mechanisms and behavior. Undergraduates are offered opportunities to learn about these developments in new and existing courses. The approach to the neurosciences is broad, covering the cellular and subcellular levels (molecular and genetic properties, cell and membrane physiology, neurochemistry), systemic levels (neuroanatomy, sensory and reflex function, brain disorders), and integrative levels (perception, memory, behavioral genetics, evolution of brain and behavior). The program emphasizes breadth in the arts, sciences and humanities, with an understanding of the neurosciences as an integral part of a liberal education. Students interested in the neurosciences should request information from the co-directors, Professors W. G. Hall (psychology) and Stephen Nowicki (zoology).

PERSPECTIVES ON MARXISM AND SOCIETY

Perspectives on Marxism and Society is a program devoted to the study of Marxist theories of society. Courses in the program focus on Marxism, not primarily as a political or ideological system, but as a scholarly methodology incorporating a variety of analytical techniques across a wide range of disciplines. The unifying theme of the program is a critical appraisal of Marxist methods of analysis and their social implications, considered in the light of theoretical alternatives and changing historical circumstances. Courses included in the program cover a wide range of subjects, including sexual and racial inequality, alienation, development and underdevelopment in the world system, labor processes, protest movements, and ideologies.

Students in the program will be required to take a core course in varieties of Marxist analysis. Four additional approved courses, no more than three from one department, will complete the program of study. A certificate will be awarded to those who meet the requirements of the program. Students in the program will be expected to major in another discipline, with the program a supplement to their major. Full details concerning the program and its courses can be obtained by writing or calling the director, Professor Fredric R. Jameson, Graduate Program in Literature and Duke Center for Critical Theory, 104 Art Museum, (919) 684-4127.

PRIMATOLOGY

The Primatology Program provides an interdisciplinary investigation of primate development and evolution from the anatomical, ecological, and behavioral perspectives. Theoretical issues arising from sociobiology and new fossil discoveries will be

tested as to their validity when applied to human evolution. The course of study leads from a generalized introduction through more specialized topics to the design and completion of a research project at the Duke University Primate Center or in a faculty laboratory under the guidance of a faculty member. The final step is an oral presentation of the research results in a senior seminar. For more information on the Primatology Program call the Department of Biological Anthropology and Anatomy at the Wheeler Building, (919) 490-6286.

SCIENCE, TECHNOLOGY, AND HUMAN VALUES

The Program in Science, Technology, and Human Values provides students an opportunity to explore the social and cultural dimensions of science, technology, and medicine. Through course work and a wide variety of extracurricular activities, students are introduced to the perspectives and insights of other disciplines in order to develop a richer and more informed understanding of their own field of specialization. The program brings together students and faculty from the sciences and engineering with their counterparts in the humanities and social sciences, with a heavy emphasis on interdisciplinary study and discussion. Detailed information is given in the chapter "Courses of Instruction" in the bulletin.

WOMEN'S STUDIES

Women's Studies is an interdisciplinary program devoted to the study of women, gender, and feminist critique. It aims to promote scholarship within all disciplines on the lives and voices of women; constructions of gender and sexualities; and the interrelationships between gender and the multiple conditions within which it operates, such as race, ethnicity, class, and history. Women's Studies has several roles: to transform scholarship in the traditional disciplines by integrating the study, contributions, and voices of women; to create a new body of interdisciplinary study and feminist theory; and to promote social change to improve the lives of women and men, girls and boys.

The Women's Studies program at Duke University began in 1982, building on courses incorporating gender issues that had been offered since the '60s and now making an explicit gender focus possible. Women's Studies offers courses with the Women's Studies (WST) designation and cross-listed courses in other academic programs and departments taught by affiliated faculty, and co-curricular activities such as lecture series, dinner seminars, reading groups, and an annual research conference. Undergraduate students may pursue either a major or a certificate in Women's Studies, the requirements for which are discussed in the Courses of Instruction section of the bulletin.

The Women's Studies program at Duke is the first in the country to have formed a national Council on Women's Studies. The council, made up of alumnae, parents, administrators, and friends of Women's Studies, works toward the development of resources, greater visibility for the program, and networking. As a service, Women's Studies offers faculty, student, and peer advising. It exchanges information about courses, internships, fellowships, and job opportunities through such channels as mailings and informal gatherings sponsored by the program. For more information on Women's Studies, inquire at the program office at 210 East Duke Building, (919) 684-5683.

RESERVE OFFICER TRAINING CORPS

Duke University and the military services cooperate in offering officer education programs to provide opportunities for students to earn a commission in the United States Air Force, Army, Navy, or Marine Corps. The programs are described below, and detailed information on scholarships, entrance requirements, and commissioning requirements is available from the offices of the Department of Air Force Aerospace Studies, the Department of Military Science (Army), and the Department of Naval

Science. Courses offered in these departments are described in the chapter "Courses of Instruction" in this bulletin.

The Air Force Reserve Officer Training Corps (AFROTC). AFROTC selects, trains, and commissions college men and women as officers in the U.S. Air Force. AFROTC offers a four-year and a two-year curriculum leading to a commission as a second lieutenant. The four-year program consists of both the General Military Course (GMC), a course sequence taken during the freshman and sophomore years, and the Professional Officer Course (POC) taken during the junior and senior years. Entry into the POC is competitive and requires successful completion of a field-training encampment between the sophomore and junior years.

The GMC is open to freshmen and sophomores. Students who complete both the freshman and sophomore years of the program and successfully compete for entry into the POC will attend a four-week training encampment. All other successful POC applicants will attend a six-week encampment. Students interested in the two-year POC program should submit applications no later than early spring semester of their sophomore year. Between the junior and senior year, POC cadets are given the opportunity to volunteer for advanced training in a variety of different areas.

Cadets may compete for two- and three-year scholarships. These scholarships pay up to full tuition, books, and a monthly tax-free stipend of \$100. All members of the POC receive the nontaxable stipend. Upon graduation all cadets are assigned to active duty with the U.S. Air Force for a period of at least four years. Direct inquiries to the Department of Aerospace Studies, 304 North Building, (919) 684-3641.

The Army Reserve Officers' Training Corps (AROTC). Army ROTC provides students with an opportunity to earn a commission as a second lieutenant in the U.S. Army, U.S. Army Reserve, or Army National Guard while completing requirements for a baccalaureate degree. Two programs are available, a four-year and a two-year program.

The four-year program consists of the Basic Course (freshman and sophomore years) and the Advanced Course (junior and senior years). Direct entry into the Advanced Course is possible under specific circumstances (two-year program). Students wishing to join the two-year program must confer with the Department of Military Science not later than April 1 of their sophomore year. There is only one mandatory summer training requirement, Advanced Camp, which takes place over a six-week period between the junior and senior years. All uniforms and AROTC texts are provided.

Upon commissioning, the service obligation may be served on active duty, in the Army Reserve, or in the Army National Guard, as directed by the Secretary of the Army. At the beginning of the senior year, cadets submit a preference statement concerning the method by which they wish to fulfill their service obligation and the specialty in which they desire to serve. A request to delay the fulfillment of the service obligation in order to attend graduate or professional schooling is also authorized.

Cadets are encouraged to compete for Army ROTC scholarships which pay 80 percent tuition, most fees, a generous textbook and equipment allowance, and \$100 per month for each month in school (up to \$1,000 per year). Nonscholarship Advanced Course cadets also receive the \$100 monthly stipend. All of the above benefits are tax-free. Participants in Advanced Camp are paid one-half of the basic pay of a second lieutenant.

Detailed information is available from the Department of Military Science, 06 West Duke Building, East Campus, Box 90752, (919) 660-3091 or 660-3090, or 1-800-222-9184.

The Naval Reserve Officer Training Corps (NROTC). The Department of Naval Science offers students the opportunity to become Naval and Marine Corps officers upon graduation. Selected students may receive up to four years of tuition, fees, uniforms, and textbooks at government expense under the auspices of the Scholarship Program.

In addition, scholarship students receive subsistence pay and summer active duty pay of approximately \$1,300 a year. They participate in four weeks of summer training either aboard ship or at naval shore facilities to augment their academic studies. Four years of active duty service as a Regular Officer is required upon graduation.

Nonscholarship students may be enrolled in the College Program. They take the same courses and wear the same uniform, but attend the university at their own expense. Uniforms and naval science textbooks are provided by the government. During the last two academic years, they are enlisted in the Naval Reserve, receive \$100 per month subsistence pay, and participate in summer training. Three years active duty service as a Reserve Officer is required upon graduation.

College Program students may compete for scholarship status through academic performance, demonstrated aptitude for military service, and nomination by the Professor of Naval Science. Students in either program may qualify for a commission in the Marine Corps through the Marine Corps Option Program. Students seeking further information on the NROTC program may call the Department of Naval Science, Hanes House, (919) 684-3841.

Off Campus Opportunities

STUDY ABROAD (Office of Foreign Academic Programs)

A Duke student may earn credit for approved work completed during the academic year at a foreign university or for an approved program abroad sponsored by Duke or by another approved American college or university in the fall, spring, and summer. To receive the maximum amount of study abroad transfer credit at Duke—generally four course credits for a full semester, eight for a full academic year, two for a summer—a student is expected to take a full, normal course load, as defined by the other institution involved. The responsible Duke departments, however, make the final decision on the final number of credits transferable. Students attending British universities for the full academic year can transfer a maximum of eight courses. However, at British universities which are on the trimester system, only three course credits may be transferred for the single fall semester. Students attending such universities in the spring are generally required to attend the two remaining trimesters and may transfer a maximum of five credits. No additional study abroad transfer credit will be awarded for a course overload. A leave of absence from the university is granted for a semester or academic year of approved study abroad. Duke-administered programs do not involve transfer credit and do not require a leave of absence. Arrangements are made normally for students to register, while abroad, for the term in which they plan to return. Seniors planning to spend their last semester abroad are subject to the residence requirement and may face postponed graduation because transcripts from abroad are often delayed. See page 95 for information concerning fees for studying abroad on non-Duke programs.

Semester and Academic Year Programs

A student who wishes to receive transfer credit for study abroad should take into account the following criteria established by the faculty and administered by the Committee on Study Abroad:

1. a scholastic average of at least a B- (a student lacking this average may petition the academic dean responsible for study abroad if there are unusual circumstances);
2. certification, when applicable, from the foreign language department concerned, that the student has an adequate knowledge of the language of the country in which study is pursued;
3. approval, obtained before leaving Duke, of the appropriate directors of undergraduate studies for the courses to be taken abroad, as well as approval of the

program and the courses by the dean responsible for study abroad and by the student's academic dean;

4. permission for leave of absence once program plans are complete.

Duke, at present, offers various programs in cooperation with other universities during the fall and spring terms. Students accepted may study in:

Austria. From time to time Duke sponsors a term program in Vienna for members of the Wind Symphony.

Britain. Duke has agreements with a number of top British universities, allowing our students to become members of outstanding teaching and research institutions in Britain for a semester or academic year. The universities currently available are the University of London (King's College, Imperial College of Science, Technology and Medicine, the London School of Economics and Political Science, Queen Mary and Westfield College, and University College); the University of Birmingham; the University of Bristol; the University of Edinburgh; the University of Manchester; the University of Sussex; and the University of Warwick. There is a special program for engineers at University College London. Applications are available in 121 Allen Building.

Canada, Montreal. Duke students participating in the Duke/McGill University Exchange Program may spend one semester or academic year at McGill, located in the Quebec city of Montreal. Because the language of instruction at McGill is English, program applicants need not have studied French although some knowledge of it would be advantageous. The program is sponsored by the Canadian Studies Center and Trinity College; information and application forms are available in 121 Allen Building.

China. In cooperation with Nanjing University and Beijing Teachers College, Duke conducts a six-month study program in the People's Republic of China in the summer and fall terms. The program includes a fall term at Nanjing University preceded by an intensive language session in Beijing. Participants must have at least one year of Chinese language. Information is available from the Asian-Pacific Studies Institute, 2111 Campus Drive, and in 121 Allen Building.

Egypt, Cairo. Through an agreement with the American University in Cairo, Duke students may spend a spring semester or academic year there taking regular classes with Egyptian students. They may enroll in general courses in humanities, social sciences, and sciences, as well as in Arabic language and specialized courses in Middle Eastern studies. Applications are available in 121 Allen Building.

England, Oxford. Through a special arrangement with two colleges at the University of Oxford, selected Duke students may spend their junior year at Oxford as regularly enrolled visiting students. The students are treated exactly like their British counterparts, and most of them live in college housing. Students may choose to concentrate their study in any one of the major fields in the humanities, social sciences, or selected natural sciences. Each student is assigned a tutor. Applicants must have a very strong academic record; previous course work in the subject to be pursued at Oxford is also required. Admission to this program is at the discretion of the University of Oxford. More information may be obtained in 121 Allen Building.

France, Paris. Duke offers a full-year program in Paris in conjunction with the University of Paris-I, IV, and VII. The language of instruction will be French; one course will be offered by the resident director, and three courses will be taught by the Parisian faculty. Applicants must have completed four semesters of French plus two courses at the 100-level or above with a grade of at least B+. Priority will be given to juniors and full-year applicants, although some participants may be admitted for one semester only. More information may be obtained in 121 Allen Building or the Department of Romance Studies, 205 Languages Building.

Germany, Berlin. Duke students study at the Humboldt University of former East Berlin (fall) and at the Free University of former West Berlin (spring). Each semester they take specially arranged courses in German language and the social sciences for Duke credit, and they audit a course of their choosing at the German university. One year (fall

or year program) or two years (spring program) of college-level German or its equivalent are required. More complete information may be obtained in 121 Allen Building.

Italy, Rome. As one of the participating members of the Intercollegiate Center for Classical Studies in Rome, Duke University may send classics majors and other students with strong classical interests for admission to a term's work at the center, usually in the junior year. Instruction is offered in Greek, Latin, ancient history, ancient art, and archaeology. Some scholarship help is available. Additional information may be obtained from the Department of Classical Studies, 236 Allen Building.

Japan, Tokyo. Qualified students may be recommended each year by the Asian-Pacific Studies Committee for the junior year exchange program with International Christian University in Tokyo. This small, select university is noted for the international character of its student body (85-90 percent Japanese, 10-15 percent non-Japanese, primarily from other Asian nations and the United States). Courses may be taken in English as well as Japanese. More information is available from the Asian-Pacific Studies Institute, 2111 Campus Drive, or 121 Allen Building.

Scotland, Glasgow. The Department of Public Policy Studies offers departmental majors the opportunity to study during the fall semester of their senior year at the University of Glasgow where, practically speaking, public policy analysis was invented. Students will live on campus and will take the program's special seminar in public policy in addition to three electives from the general university curriculum. Further information may be obtained from the director of undergraduate studies in the Department of Public Policy Studies, 217 Old Chemistry Building.

Spain. This program offers advanced students a variety of on-site experiences and an opportunity to hear and speak Spanish in an ideal environment. The program offers courses in Spanish history, culture, literature, politics, and arts, as well as several organized excursions. Students are housed with selected Spanish families. More information may be obtained in the Department of Romance Studies, 205 Languages Building, or in 121 Allen Building.

A number of additional approved programs sponsored by other institutions are also available to Duke students for study abroad. Further information concerning semester and academic year programs, as well as summer programs, may be obtained in 121 Allen Building. All Trinity College students are responsible for following the procedures and meeting the deadlines set forth in materials available in 121 Allen Building. In all cases, the dean of study abroad must be informed in advance about a student's plans.

Duke Summer Programs Abroad

The Office of Foreign Academic Programs, in cooperation with several university departments, provides many opportunities for students to study abroad during the summer while earning Duke University credit. Information about Duke Summer Programs Abroad and about the time they will next be offered can be obtained from the program directors or the Office of Foreign Academic Programs, 121 Allen Building.

Argentina, Buenos Aires. This two-course, six-week program will focus on Argentinian culture and labor history. Students will enroll in two history courses on the 100 level which will be taught in English. Field trips are part of the courses. Professor Daniel James of the History Department at Duke University will teach one of the courses and direct the program. The program will be based at the Universidad Torcuato di Tella in Buenos Aires. Accommodations will be in private homes. For further information consult the Office of Foreign Academic Programs, 121 Allen Building.

Australia, Sydney. This two-course, six-week program will focus on the relationship between economics and the environment and will be based in Sydney at the University of New South Wales. One course, to be taught by a professor at the University of New South Wales, will cover the economics of the Pacific Rim with special emphasis on environmental issues. The second course will focus on environmental/ecological issues and will be taught by a Duke University professor, who will also direct the program.

Students will be housed in accommodations at the University of New South Wales. For further information consult the Office of Foreign Academic Programs, 121 Allen Building.

Belgium/Netherlands. This two-course, six-week program will focus on a contextual study of Late Medieval, Renaissance, and Baroque art and culture in Belgium and the Netherlands. The courses are: Art 158-159: Art and Cultural History of Flanders and the Netherlands from the Fifteenth through the Seventeenth Centuries (AL) (cross-listed with Comparative Area Studies) taught in English by Professor Hans van Miegroet of Duke, Dutch and Flemish guest lecturers, and art specialists. The program is based for the first two weeks in Amsterdam (Netherlands) and for the remaining four weeks in Gent (Belgium). Participants visit numerous Dutch and Belgian cities and museums. Accommodations are in hotels. For further information consult Professor Hans van Miegroet, Department of Art and Art History, 112 East Duke Building or the Office of Foreign Academic Programs, 121 Allen Building.

Canada. This two-course, six-week program provides a complete immersion in French. This is a Duke-approved rather than a Duke-administered program; students receive transfer credit for work successfully completed. Students are placed in one of nine levels of language instruction during the program. Upon return they are tested and then placed in the appropriate Duke level if they intend to continue with French language studies at Duke. Instruction and accommodations are by the University of Quebec, Trois Rivières campus. For further information consult Professor Clark Cahow, Canadian Studies Program, 2016 Campus Drive or the Office of Foreign Academic Programs, 121 Allen Building.

France, Paris. This two-course, six-week program provides the opportunity to take Duke courses in the ambience of Paris. French 137: Aspects of Contemporary French Culture (CZ, FL) (cross-listed with Comparative Area Studies), is a conversation course taught by a native French speaker; the second course is offered by the Duke director. Four semesters of college French or equivalent are required. Students live in dormitory-style accommodations. For further information consult the Office of Foreign Academic Programs, 121 Allen Building.

Germany, Erlangen. (German Language and Culture Program.) Duke offers two programs at the Friedrich-Alexander Universität at Nürnberg. One program (mid-May to the end of June) provides an opportunity to study classroom German at different levels while living with a German family and participating in study, day trips, and excursions. The courses are German 150: Composition (FL); German 153: Aspects of Contemporary German Culture (CZ, FL) (cross-listed with Comparative Area Studies). Two semesters of college German or the equivalent are required. In the other program (early May to the end of July), advanced students may choose from a variety of FAU courses all taught in German and remain for a full summer semester (through early August). Semester program students live in dormitories. For further information consult Professor Helga Bessent, Department of Germanic Languages and Literature, 107 Languages Building or the Office of Foreign Academic Programs, 121 Allen Building.

Greece. A four-week, one-course program in Greece focusing on the cultures of ancient Greece. The course, Classical Studies 157 / Art 115: Ancient Greece (CZ), is taught by Professor John Younger of Duke University who will also be the program director. The course concentrates on Athens and southern Greece and consists of on-site lectures at numerous sites of historical and archaeological interest throughout the area. Travel will be provided in Greece by private coach. Accommodations will be in hotels. For further information consult Professor Younger, Department of Classical Studies, 228 Allen Building or the Office of Foreign Academic Programs, 121 Allen Building.

India, Bombay. This two-course, six-week program focuses on the emergence of modern Indian society and media. The courses are History 100E: Indian History and the Present (CZ), taught by a professor from the University of New Delhi, and Asian and African Languages and Literature 138: The Media in Modern India (CZ), taught by

Professor Satti Khanna of Duke. (Both courses are cross-listed with Comparative Area Studies.) The program will be based at the International School of Bombay. Accommodations are in a hotel. For further information consult Professor Satti Khanna, Asian and African Languages and Literature, 2101 Campus Drive or the Office of Foreign Academic Programs, 121 Allen Building.

Israel, Galilee. This two course, six-week program gives students an opportunity to participate in an archaeological dig. The program is designed to introduce students to the discipline of field archaeology and to the religious, social, and cultural history of ancient Palestine from the Greek period to the Islamic period. The field excavations are located in Galilee at ancient Sepphoris, the administrative capital of that region in the first century C.E. Students register for Religion 99/Cultural Anthropology 99/Classical Studies 99/Interdisciplinary Course 99: Perspectives in Archaeology (CZ), taught by Professor Carol Meyers of Duke and Religion 132D: Palestine in Late Antiquity (CZ) taught by Professor Eric Meyers of Duke. All courses are taught in English. For further information consult Professor Carol or Eric Meyers, Department of Religion, 117 Gray Building or the Office of Foreign Academic Programs, 121 Allen Building.

Italy, Florence. This two-course, six-week program will focus on Renaissance Florentine history and art (Art 145: Renaissance Art in Florence (AL) and Italian 123: Aspects of Italian Literature, Florence and Tuscany: 400 Years of Literature (AL)). Courses will be taught in English under the direction of a Duke University professor. Students live in a hotel. For further information consult the Office of Foreign Academic Programs, 121 Allen Building.

Italy, Rome. This one-course, three and one-half week program in Rome explores the history and culture of Rome and includes visits to historical sites and museums, walking lectures, and readings. The course Classical Studies 145/ Art 126: Rome: History of the City examines the history of the city from the earliest times through the Baroque and modern periods. The course is taught in English. Students will have accommodations in dormitories. For further information consult the Office of Foreign Academic Programs, 121 Allen Building.

Japan. This two-course, six-week program at Hosei University near Tokyo focusing on Japanese culture and Japanese business management. One course is taught by Duke faculty, the other by faculty of Hosei University. Both courses are taught in English. Students live variously in a hotel, dormitories, and with families. For further information inquire at the Office of Foreign Academic Programs, 121 Allen Building.

Morocco. This two-course, six-week program offers the opportunity to study North African religion and Moroccan culture at the Cadi Ayyad University of Marrakesh. Courses are taught in English. Field trips are part of the courses. Accommodations are in hotels. For further information consult Professor Vincent Cornell, Department of Religion, 115 Gray Building or the Office of Foreign Academic Programs.

Russian Republic. This program offers two Russian language and culture courses in St. Petersburg. Russian language study at different levels will be offered. Classes in St. Petersburg will be taught at the University of St. Petersburg by faculty members of the university. Prerequisite: a minimum of two semesters of college-level Russian is suggested. Students will be housed in an apartment-hotel. For further information consult Professor Edna Andrews, Department of Slavic Languages, 314 Languages Building or the Office of Foreign Academic Programs, 121 Allen Building.

Spain. This two-course, six-week program in Malaga and Madrid offers advanced Spanish students further language training as well as the opportunity to study Spanish culture, history, and politics. Participants can choose two of the following courses: Spanish 131: Spain, Yesterday and Today (CZ, FL); Spanish 137: Art and Civilization (CZ, FL); Spanish 141S: Literature and the Performing Arts (AL, FL); and Political Science 100M.01: Government and Politics of Spain (SS). There will also be excursions to Barcelona, Salamanca, Toledo, Segovia, Granada, Sevilla, and Cordoba. All courses are conducted in Spanish, and students live with Spanish families. For further information

consult Professor Miguel Garci-Gómez, Department of Romance Studies, 205 Languages Building or the Office of Foreign Academic Programs, 121 Allen Building.

United Kingdom, Cambridge. A two-course, six-week program directed by Professor Peter Fish of Duke University will focus on the contributions of English law to American constitutionalism and law as well as on the historical and contemporary political and legal system of Britain. The courses are Political Science 100D.01: American Law and Legal Institutions in Comparative Perspective, taught by Professor Fish, and Political Science 100D.02: Modern British Law and Courts in Historical Perspective taught by a faculty member from Britain. Accommodations will be at Emmanuel College of Cambridge University. Excursions will be made to the English courts at London, Ely, and Norwich, and to the Scottish courts at Edinburgh. For further information consult Professor Peter Fish, 503 Perkins Library, Department of Political Science or the Office of Foreign Academic Programs, 121 Allen Building.

United Kingdom, London and Wales. A two-course, six-week program dealing with the evolution of the British welfare state from the industrial revolution to the present as compared to the U.S. experience. The course, History 100D: The Evolution of the British Welfare State in Comparative Perspective (CZ), is taught by Dr. Sharon Grimes of Duke University. A faculty member from Britain will teach Philosophy 118: Philosophical Issues in Medical Ethics (CZ), dealing with ethical issues in health care. For further information consult Dr. Sharon Grimes, 1111A Academic Advising Center or the Office of Foreign Academic Programs, 121 Allen Building.

United Kingdom, London-Drama. This two-course, six-week program offers the opportunity to study drama using the resources of London's theaters in conjunction with study of dramatic texts. The courses are Drama 148S/English 176S: Text and Performance (AL) and Drama 149S/English 134S: Drama in Performance (AL). Both courses are taught jointly by Professor John Clum of Duke and a distinguished group of British theater practitioners from London and Bristol. The group will attend many theater productions in London and at Stratford-upon-Avon. Accommodations are in a dormitory of the University College, London. For further information consult Professor John Clum, 304B Allen Building or the Office of Foreign Academic Programs, 121 Allen Building.

United Kingdom, Oxford. This six-week session at New College, Oxford, utilizes the Oxford tutorial system of education supplemented by lectures given at the University of Oxford's International Graduate Summer School by noted British scholars. Areas of study include British Literature 1760-1830, Twentieth-Century British Literature, Modern British History, Politics and Government in Britain since 1945, and Law: Personal Injuries in United Kingdom and the United States. For further information consult Professor Thomas Robisheaux, 305 Carr Building or the Office of Foreign Academic Programs, 121 Allen Building.

DUKE UNIVERSITY MARINE LABORATORY (School of the Environment)

The Duke University Marine Laboratory (DURL) is located within the Outer Banks, adjacent to the historic seacoast town of Beaufort, North Carolina, with direct access to the Atlantic Ocean, Cape Lookout National Seashore Park, sand beaches and dunes, estuaries, wetlands, and maritime forests. Because of the dynamic collisions of offshore currents, the area provides an excellent opportunity for marine study. A component of the School of the Environment, the Duke University Marine Laboratory is an interschool teaching and research facility dedicated to the study of coastal and oceanic processes and human disturbances of those processes. The Beaufort campus of Duke has available dormitory and dining facilities, classroom laboratories, research buildings, a specialized marine science library, as well as a variety of boats which are utilized in both teaching and research activities. A year-round seminar series which includes both guest lecturers and the resident academic and research staff additionally serves to enrich the student community.

At the undergraduate level, the Marine Laboratory serves students in the natural and environmental sciences as well as those in the social sciences, humanities, or engineering who have adequate preparation. Academic programs include a fall semester and spring semester for undergraduate juniors and seniors, summer courses designed for both undergraduate and graduate students, and a cooperative program for students from several colleges and universities. The academic programs integrate classroom lectures and laboratories with direct field and shipboard experiences. For additional information and application materials, write to the Admissions Office, Duke University, School of the Environment, Marine Laboratory, Beaufort, North Carolina 28516-9721.

AGREEMENTS WITH OTHER UNIVERSITIES

Neighboring Universities. Under a plan of cooperation, the interinstitutional agreement among Duke University and the University of North Carolina at Chapel Hill, North Carolina State University at Raleigh, and North Carolina Central University in Durham, a student regularly enrolled in Duke University and paying full fees may enroll for one approved course each semester at one of the institutions in the cooperative program. One interinstitutional course per summer may be taken at a neighboring institution participating in this agreement provided that the student is concurrently enrolled at Duke for one full course credit. This agreement does not apply to contract programs such as the American Dance Festival.

Approval forms for courses to be taken at these neighboring institutions may be obtained from the offices of the academic deans at Duke. Ordinarily, only those courses not offered at Duke will be approved. Credit so earned is not defined as transfer credit since grades in courses taken under the interinstitutional agreement are entered on the official record and used in determining the quality point ratio. The student pays any special fees required of students at the host institution and provides transportation.

Howard University. Duke students participating in the Duke/Howard University Exchange Program may spend a semester studying at Howard University in Washington, DC, while Howard undergraduates enroll for the same period at Duke. More information about this program, administered by Trinity College, is available in 121 Allen Building.

Special Summer Programs

DUKE SUMMER FESTIVAL OF CREATIVE ARTS

The Duke Summer Festival of Creative Arts is administered jointly by the Summer Session Office and the Office of Cultural Affairs. The festival provides an exciting, artistically stimulating environment for the campus and community. The Ciompi Quartet, Duke's well-known chamber music ensemble, will perform. Other special events such as jazz concerts, carillon recitals, dance and theater performances, and film series are planned.

The American Dance Festival. The six-week program offers a wide variety of classes, performances, and workshops. For a catalog, write to the American Dance Festival, Duke University, Box 6097 College Station, Durham, North Carolina 27708.

PRECOLLEGE PROGRAM

During the summer of 1994, Duke University will offer a Term II program for academically talented rising high school seniors from across the country. The PreCollege Program is designed to provide the academic challenge of college-level courses to qualified college-bound students and to help prepare them for the adjustments they will be making when they enter college. Students will enroll in two regular summer sessions.

classes with Duke undergraduates. Introductory level courses in the humanities, social sciences, and natural sciences will be offered for college credit. The students will live in supervised, air-conditioned university dormitories, eat their meals in the university dining halls, enjoy the opportunity of studying with distinguished members of the Duke faculty, and will have access to all university libraries and athletic facilities. In addition to the classroom experience, PreCollege students participate in a range of programs and activities designed to aid them in college selection, career exploration, and intellectual and social development. For further information consult the PreCollege Program, Duke University, Box 90747, Durham, North Carolina 27708-0747, (919) 684-3847.

Campus Life and Activities



Student Affairs

The mission of Student Affairs is to create opportunities and challenges for students to broaden their intellectual, spiritual, and emotional horizons—and, in so doing, to engage them with the widest range of persons both within the university and beyond in striving towards a community which reflects the highest aspirations of all its members.

The Division of Student Affairs complements the educational mission of the university by helping to relate many of the nonacademic components of the university to the academic experiences of the students. The residence halls, the athletic fields, the Chapel, and many student organizations play an important humanistic and holistic role in the students' university experience by developing leadership qualities, skills in interpersonal relationships, and appreciation for the care of the physical self. Thus, the university experience encompasses collectively the life of the mind, body, emotions, and, indeed, the spirit.

Residential Life

Duke has a long tradition as a residential university and has sought to provide convenient housing for the majority of the undergraduate students. While the university was established to provide a formal educational opportunity for students, Duke has always taken the position that education encompasses social and personal development as well as intellectual growth. In order to facilitate such a holistic approach, Duke seeks to provide a supportive environment substantially anchored in its residential program.

Although first-year students are required to live in the university residence halls, a number of upperclassmen choose to live off campus. Students enrolled beyond their fourth year of the undergraduate program cannot be granted space in university housing. Part-time students and former students who have been readmitted are not eligible for on-campus housing.

Residence Halls and Apartments. The university accommodates approximately 91 percent of its undergraduates in sixty-six residence hall living groups located on East, West, and North Campuses and in apartments located on Central Campus. Within one of the residence halls, there are language corridors for students interested in speaking French, Spanish, German, and Russian. Other residence halls house the Arts Theme House for students interested in, but not necessarily majoring in, the arts; the Women's Studies House; and students interested in community service.

University housing is considered to include residence hall space as well as Central Campus Apartments. Placement in any of these areas fulfills the university's obligation to house eligible students in university housing. Free on-campus bus service connecting East, West, North, and Central Campuses is provided by the university.

First-year students live together in residence halls clustered on several campuses; upperclass students reside not only in all-upperclass residence halls but also in Central Campus Apartments. Residential fraternities are housed in sections of upperclass residence halls; by tradition, sororities are not residential. Housing assignments for first-year students are made by lottery to residence halls while upperclass housing assignments are made by a combination of lottery and student choice. Within the residence halls, students live in single, double, or triple rooms. Living groups elect officers and organize social, intramural, educational and cultural programs, as well as community service projects.

All of the residence halls have resident advisors who live in the houses and are members of the staff of the Office of Student Development. These graduate and undergraduate students have broad responsibilities in the residential life of the university, including counseling students with personal problems, advising the house governments, and serving as resource persons for students.

Residence Hall Programming. Educational and cultural programming is planned and presented throughout the year in the residence halls through the cooperative work of the Office of Student Development, Trinity College of Arts and Sciences, the School of Engineering, and resident students. There are a number of faculty members in residence in both first-year student and upperclass houses. Faculty offices and seminar rooms are also located in several of the first-year student houses. The goals of these various residential programs are to enhance the quality of intellectual and social life for the residents on campus, to facilitate student-faculty interaction outside the formal classroom, and to develop a greater sense of community within the individual residence halls as well as within the greater university.

Living Off Campus. The option of living off campus is available for students after the first semester of their first year, and those who choose this option may retain their resident status and eligibility for University housing if they follow the proper procedures as published by the Office of Student Development.

Dining Facilities

All students living in campus residence halls are required to participate in a dining plan. Several dining plans are available, all of which allow a student to make purchases in a wide variety of dining locations by accessing a prepaid account carried on the student identification card, or DukeCard (see 'Food and Other Expenses' in the chapter "Financial Information"). Duke Dining Services provides cafeterias, restaurants, fast food operations, delis, snack bars, ice cream/dessert shops and catering services.

Dining service operations are located on each campus. Facilities on East Campus include the East Food Court (a collection of food shops including Li'L Dino subs, a grill, international food station, salad bar/healthy food shop, pasta area, deli, pizza station, and a dessert/ice cream shop), the East Union Cafeteria, Upper East Side (snack bar), and the Magnolia Room (restaurant). On West Campus, students may use their dining plan in the Blue & White Room (cafeteria), the University Room (cafeteria), the Oak Room (restaurant), the Cambridge Inn (featuring the Weigh Station food bar, breakfast bar, deli, hot subs, pastry, and desserts), the Rathskeller Sports Bar (hamburgers, pasta, and sandwiches), Burger King (fast foods), and Licks (ice cream/frozen yogurt). North and Central Campus locations include Trent Drive Cafe and The Pub on Central Campus (specialty sandwiches, salads, and beverages).

University Catering accepts dining plan funds from individual students or student groups and will provide food and/or catering services for cookouts, study breaks, banquets, parties, or any other campus event. Students may also use the funds in their dining plan to purchase food items in three campus convenience stores: Uncle Harry's General Store on Central Campus, The East Campus Store on East Campus, and the Lobby Shop on West Campus. Dining plan funds may also be used to order pizza and sub sandwiches delivered to campus from participating area businesses.

Religious Life

Two symbols indicate the importance of religion to this university since its founding: *Eruditio et Religio*, the motto on the seal of the university, and the location of the Duke Chapel at the center of the campus. People from all segments of the university and the community gather in Duke Chapel on Sunday morning to worship in a service which offers excellent liturgy, music, and preaching. The world's outstanding Christian preachers have preached from the Duke Chapel pulpit.

The dean of the Chapel and the director of Religious Life work with the campus ministers and staff from the Roman Catholic, Jewish, and Protestant communities, and with other groups to provide a ministry which is responsive to the plurality of religious interests on the campus.

Through the religious life of the university, students are encouraged to search for meaning, to ask the ultimate questions, to worship, to meditate in the beautiful chapel, to learn from outstanding theologians from a wide array of traditions, and to work to bring about a more just and humane society.

Services Available

The Office of Student Development. This office works with the Duke student body in a variety of ways and is concerned with creating a residential community supportive of a solid educational experience. It advises individual students regarding personal problems, houses undergraduates in the residence halls, and assists students to plan and present educational and cultural programs within the residence halls.

One hundred twenty resident advisors (RAs), staff members of the Office of Student Development, reside in the residence halls and are directly responsible for the administration of the student residences and their programs. They also are available for counseling students and/or referring them to the various personnel services which provide specialized advice or counsel.

The office develops and implements the orientation program for new students. First-year student advisory counselors (FACs), who are upperclass men and women selected for qualities of responsibility and leadership, work through the Office of Student Development. Members of the FAC program are assigned to a small group of first-year students and, during orientation, welcome their groups and help to acquaint them with the university.

Judicial affairs are handled through the office by coordinating and applying the general rules and regulations of the university as well as working with all participants involved in the judicial process and coordinating the student advising system.

The Office of Student Development also works with transfer students, advises student residential living groups, assists students with disabilities, coordinates the Student Health and Student Insurance Policies, and oversees the university's response protocol to student emergencies.

The Student Health Program and Service. The Student Health Program, which provides medical service, advice, and education for all currently enrolled full-time students and part-time degree candidates, is administered by the Department of Community and Family Medicine, Duke University Medical Center.

The primary location for medical care is the Duke Family Medicine Center (Marshall Pickens Building) where students are seen, by appointment, for assessment and/or treatment. When a student's health needs warrant additional specialized treatment, the Duke Family Medicine Center serves as a portal of entry to other health resources within the Duke medical community. The Infirmary, another Student Health facility, provides inpatient treatment of illnesses too severe to manage in residence halls or apartments, but not requiring hospitalization. If necessary, Duke Public Safety provides on-campus transportation to the health care facilities. A Student Sports Clinic is also available for treatment of sports-related injuries.

The health education component of Student Health is headquartered on the first floor of Trent Drive Hall. There is also a satellite office, called the Healthy Devil Health Education Center, on West Campus. A full-time health education staff is available to assist students in making informed decisions that lead to healthy lifestyles at Duke and beyond. Topics of concern and interest include alcohol and other drug usage, eating and nutrition, sexual activity, and stress management. Programs, meetings, and consultations are provided for groups and individuals.

A list of students in the infirmary or hospital is routinely provided to the academic deans, who issue excuses to students when appropriate. However, information regarding the physical or mental health of Duke students is confidential, released only with the student's permission. This policy applies regardless of whether the information is requested by university officials, friends, family members, or health professionals not involved in the student's immediate care.

All currently enrolled full-time students and part-time degree candidates are assessed a Student Health Fee for each enrolled semester. This covers most of the services rendered within the Student Health Program. An optional Summer Health Fee for students who are not enrolled in summer sessions is also available through the bursar's office.

In addition to the Student Health Service, the university makes available a plan of accident and sickness insurance to protect against the high cost of unexpected illnesses or injuries which are not covered by the Student Health Fee and would require hospitalization, surgery, or the services of specialists. This insurance covers students both on and off campus, at home, or while between home and school during interim vacation periods throughout the one-year term of the policy. All full-time students and part-time degree candidates are required to enroll in this insurance policy unless they show evidence that they are covered by other generally comparable insurance. This waiver statement, contained in the remittance form of the university invoice, requires that the name of the insurance company and policy number be indicated as well as the signature of the student or parent. International students, as well, are required to show proof of health insurance coverage (either the policy offered by Duke or comparable coverage) and may not assume responsibility for personal payment of health care cost.

Upon arrival on campus, all students receive a detailed brochure about the Student Health Program and the services covered by the Student Health Fee. Additional copies of the brochure are available at the Duke Family Medicine Center and at the Office of Student Development.

Counseling and Psychological Services. Counseling and Psychological Services (CAPS) provides a comprehensive range of counseling and developmental services to assist and promote the personal growth of Duke students. The professional staff is composed of psychologists, clinical social workers, and psychiatrists experienced in working with young adults. They provide evaluation and brief counseling/psychotherapy regarding a wide range of concerns, including such issues as self-esteem and identity, family relationships, academic performance, dating, intimacy, and sexual concerns. While students' visits with counselors are usually by appointment, emergencies are handled when they arise.

Each semester, CAPS offers a series of counseling groups and seminars focusing on enhancement of self-understanding and coping strategies. Support groups have been offered for second generation Americans; African American students; students with bulimia; and gay, lesbian, and bisexual students. Seminars have addressed such topics as stress management, social skills development, bulimia, and dissertation problems.

As Duke's center for administration of national testing programs, CAPS also offers a wide variety of graduate/professional school admission tests. The staff is also available to the entire university community for consultation regarding student development and mental health issues affecting not only individual students but the campus community as a whole. They work with campus personnel, including administrators, faculty, student health staff, religious life staff, resident advisors, and student groups, in meeting needs identified through such liaisons. Staff members are also available to lead workshops and discussion groups on topics of interest to students.

CAPS maintains a policy of *strict confidentiality* concerning information about each student's contact with the CAPS staff. If a student desires that information be released to anyone, written authorization must be given by the student for such release. Evaluation and brief counseling/therapy as well as skills development seminars are covered by the student health fee. There are no additional costs for these services.

For additional information, see the *Bulletin of Duke University: Information and Regulations*, or call (919) 660-1000.

Sexual Assault Support Services. Located in the Women's Center, the Office of Sexual Assault Support Services offers advocacy, support, and twenty-four hour crisis intervention services to victims of rape and sexual assault. The S.A.S.S. coordinator trains groups such as the resident advisors and DARE (Duke Acquaintance Rape Education) and initiates ongoing educational programs to alert students to problems of sexual assault and interpersonal violence.

Career Development Center. The mission of the Career Development Center is to educate the students of Duke University in the arts of self-assessment, career exploration, career planning, and job hunting with the goal of helping them develop rewarding and fulfilling careers. The center primarily serves the students and alumni of Trinity College, the School of Engineering, and the Graduate School.

Career counselors are on staff helping students early in their lives at Duke to begin the process of discovering career interest. Career specialists then help students focus on specific career fields, including the arts, business, community service, education, engineering, mathematics, computer science and the physical sciences, government, health and life sciences, international careers, and mass media. Career specialists also work closely with the faculty and the deans of Trinity College in directing students interest towards effective application to graduate and professional schools.

Programs and services of the center include the Career Apprenticeship Program offering semester-long internships in local area businesses, the Health Careers Internship Program offering experiences at the Medical Center and elsewhere in Durham, the Service Learning Project offering stipends for summer work in community service, the On-Campus Recruiting Program offering interviews for summer and permanent positions with a wide variety of national organizations, and the Credential Service which collects and sends letters of recommendation.

The Career Spectrum, a weekly career newsletter, is designed to keep students constantly aware of career-related opportunities on and off-campus. Announcements of job openings, career seminars, workshops, and information sessions are announced each week. The Career Library and J.O.B. Room provide a wealth of printed and database materials on specific career fields and specific employers. CareerSource, a new online computer career database, provides information at computer clusters located throughout the university and is available until midnight everyday. By using CareerSource, a

student may review bulletins, information about the center, review summer and full-time job listings, and register to participate in center programs.

Offices for Program Planning

The Office of University Life. The Office of University Life helps enhance the climate of the campus through the programming efforts of such organizations as the University Union, the Mary Lou Williams Center for Black Culture, the Duke Artist Series, Broadway at Duke, Duke Debate, the Craft Center and through advising student clubs and organizations. The Bryan Center Information Desk is also under the auspices of this office.

The Office of University Life is responsible for the creation, coordination, and implementation of many of the cultural and popular entertainments which take place on campus. The office is directly responsible for the Duke Artists Series and the Chamber Arts Society Series; it also schedules the use of Page Auditorium and directs the use of this hall. For the Summer Session Office, this office directs the Duke University Summer Festival of the Arts and works with the Institute of the Arts. Performances relating to campus, drama, music, and arts organizations are facilitated through this department's Page Box Office, which also serves all other programs. In addition to these arts-related activities, the Duke University Yearly Calendar is published and distributed from this office. All campus events should be recorded by the calendar office as early as possible in order to avoid conflicts. The office also serves in an advisory capacity to student groups sponsoring major events.

The Office of University Life also serves as a resource for student organizations, student leaders, the Duke University community and the community-at-large, in a manner which fosters an environment of trust and exploration of new experiences. As such, the staff members serve as educators and direct service providers, developing a community that strives toward excellence. To these ends, the office promotes the development of leadership skills through a variety of programs which both educate and support individual students and student organizations, while recognizing and saluting their efforts; is the central resource for information concerning student organizations, acting both as a liaison and an advocate; facilitates the financial management of organizational funds, both providing counsel and direct services.

The Mary Lou Williams Center for Black Culture is also part of the Office of University Life. The center was dedicated in memory of the "great lady of jazz" and former artist-in-residence whose name it bears. Since its beginning, the center has established its significance as the gathering place on campus where broadly-based issues of social/cultural relevance are addressed to an increasingly larger cross-section of the Duke Community. The center's audience includes greater numbers of students who are prepared to honor the wonder of African-American history and culture. Such is addressed each year in many programs and events celebrating black possibilities and black successes. Among past programs have been art exhibits by renowned African-American artists, musical events, film series, film seminars, and a number of lecture-discussions of relevant topics. In addition, the center has expanded its programs from the particularly black to include Asian, Hispanic, Native American and Indian students, all of whom evoke new possibilities for multicultural appreciation. In the past several years, the center has been used increasingly by faculty, student, and employee groups for meetings, receptions, lunches, seminars, and programs.

Another part of the Office of University Life is the Duke University Union which was founded in 1955 "to promote social, cultural, intellectual, and recreational interaction among all members of the university community in such a way as to complement the educational aims of the university." Operating under a board consisting of undergraduate and graduate students, faculty, administrators, and university employees, the union's programming committees present a range of programs including touring professional theater, rock, pop, jazz and classical music concerts, film screenings, art

exhibits, major speakers, crafts fairs and more constituting over 200 performances and presentations each year. In addition the Union operates the on-campus television station (Cable 13), FM radio station (WXDU), a film production program and produces and markets the world's first annual college video yearbook. The Union also operates craft centers on East Campus and West Campus and coordinates planning and operating policies of the Bryan Center. Union programming committees are open to any member of the Duke community.

The Women's Center. The Women's Center, an office serving both women and men, is the locus for advocacy, programming, and information/referral for students on gender issues. Working in cooperation with other University units such as the Women's Studies Program, Counseling and Psychological Services, and Student Health education, the mission of the center is to promote a safe, healthy, and mutually empowering climate for female and male students, both inside and outside the classroom.

The center offers research support and participates in university policy-making processes that concern gender and campus climate issues. The center provides support and direct advocacy for students who have gender-related concerns. There are an on-site art gallery, library, and resource file. In conjunction with the permanent staff, student staff develop and lead programming. Specific foci are women of color, lesbian and bisexual women, sorority women, safety, mentoring, and health.

The Women's Center serves as advisor to diverse student organizations, including sororities, Men Acting for Change, Duke Acquaintance Rape Education and politically-oriented groups. The Women's Center also includes the office of Duke Sexual Assault Support Services.

International House. International House is the center of cocurricular programs for almost eight hundred students at Duke from seventy-nine countries, as well as for U.S. American students who have lived abroad, are interested in other cultures, are considering study abroad (see the section on study abroad in the chapter "Special Programs"), or are planning to travel outside the United States. The International Association, sponsored by International House and composed of both U.S. American and foreign students, plans social and cultural programs which emphasize personal contact and informal exchange of ideas among students from diverse backgrounds. Included are weekly open houses with lectures, discussions, films, potluck dinners or parties; and periodic trips outside of Durham.

Programs of International House which assist students from abroad in participating in the life of the Duke and Durham communities include an intensive orientation program at the beginning of the academic year; the International Friends Program, in which interested international students may become acquainted with U.S. American families or individuals; Duke Partners, in which an international student is paired with a U.S. American partner for weekly meetings to work on language and life skills; Speakers' Bureau, which arranges for international students to speak at civic and social groups as well as schools in the Durham community; and English conversation classes which meet four hours a week on campus. A new program, begun in 1993, is a group for "Global Nomads." "Global Nomads" are U.S. American and international students who have spent their formative years living outside their countries of passport due to a parent's or parents' work in the diplomatic corps, military, missionary field, international business areas, or in intergovernmental agencies.

International House also has a visa specialist on the staff who works with students from abroad in fulfilling the various immigration and tax formalities involved in coming to Duke. Further information may be obtained from International House, 2022 Campus Drive, (919) 684-3585.

Office of Intercultural Affairs. The Office of Intercultural Affairs (OIA) has responsibility for identifying and assisting with changes in the Duke University community which promote optimum growth and development for African-American, Asian-Amer-

ican, Latino-American, and Native American undergraduate and postbaccalaureate students. The office conducts such activities as public forums on student life, mentorship projects with university alumni, seminars on current issues for students of color, institutional research on development of students of color, and serves as a resource on issues of students of color for the university community.

The Community Service Center. The Community Service Center is a clearinghouse for the numerous volunteer and community service activities available to students, faculty, and employees. Through the center, members of the Duke community can become involved with student service groups and Durham area agencies doing everything from tutoring and mentoring, helping to care for people with AIDS, and serving meals at local homeless shelters, to befriending senior citizens and earning work-study money in any of over seventy community service internships. The Community Service Center also sponsors speakers, special events, training sessions, and many other programs. In these ways, the center strives to raise awareness about contemporary social issues, to provide opportunities for students to link their service work and coursework, and to be a catalyst for creative partnerships between Duke University and the wider community.

Student Organizations

Duke Student Government. The Duke Student Government (DSG) is the voice of the undergraduate student body of Duke University. DSG is responsible for articulating undergraduate student thought on issues relevant to the university and for working to improve the educational process and university environment. The working philosophy of DSG is that students have the right to participate in the university's decision-making process on matters that affect the student body. Coordinating the efforts of individuals and organizations, DSG lobbies University administrators on practices and policies which govern all facets of life at Duke.

The Cabinet is responsible for the implementation of all legislative action and for the coordination of the organization. It consists of the president, five vice-presidents (executive, student affairs, academic affairs, facilities/athletic affairs, and community interaction), an executive secretary, administrative secretary, president pro-tem, chief of staff, attorney general, chief justice, director of public relations, director of student services, treasurer, and director of undergraduate computing.

The DSG legislature is composed of representatives from each undergraduate living group on campus, representatives of students living off campus and on Central Campus, and at-large representatives selected from the entire student body. Position statements and policies are initiated and debated through this body. Representatives then return to their constituencies to discuss the issues at hand. Within the legislative body, there are four standing committees which focus more closely on specific issues and projects. Every representative is required to participate on at least one standing committee. The Student Organizations Finance Committee (SOFC) is the only elected committee from the DSG legislature. The SOFC serves as both an appropriations and advisory committee for student-run organizations. It is responsible for presenting recommendations to the Legislative Body for the allocation of the student activities fee to various chartered student organizations.

DSG not only offers the opportunity for students to have input in university development, but also many unique student services. DSG's services seek to aid every undergraduate during his/her Duke career. These services include free legal advice, check cashing service, a pregnancy loan fund, a bail loan fund, and a computerized ride-rider service.

Cultural and Social Organizations. The scope of the more than three hundred student organizations is suggested by a partial listing of their names: Alpha Phi Omega service fraternity, Black Student Alliance, Baptist Student Union, Cheerleaders, Interna-

tional Association, Duke Ice Hockey, Outing Club, Sailing Club, Model United Nations Club, Photography Group, and the N.C. Rural Health Coalition. Twenty-one national social fraternities and twelve national sororities are represented on campus. They are governed by the Interfraternity and Panhellenic Councils, respectively.

Many opportunities are provided on campus in the areas of music and drama. The Chorale, Modern Black Mass Choir, Chapel Choir, Wind Symphony, Marching Band, Symphony Orchestra, and Collegium Musicum are examples of musical organizations. Duke Drama provides opportunities for non-drama majors to perform established and experimental drama; Hoof 'n' Horn presents musical comedy; Karamu performs drama related to the black experience.

Several academic departments sponsor organizations and programs for students with special academic or professional interests. There are over twenty academic department majors unions on campus. There are also academic and leadership honorary societies.

Media. The *Chronicle*, the campus newspaper, publishes five issues weekly and is governed by the Chronicle Board. A weekly report of campus information (*The Guide*), a humor magazine (*Jabberwocky*), a literary magazine (the *Archive*), a special topics newspaper (*The Missing Link*), a feature magazine (*Tobacco Road*), a science magazine (*Vertices*), a photography magazine (*Latent Image*), Duke's black literary publication (*Prometheus Black*), a journal of campus news and opinion (*Duke Blue*), and the *Duke Journal of Politics* are published on a regular basis by students. In addition, a *Teacher-Course Evaluation Book*, *The Student Guide to Duke*, *The Duke Women's Handbook*, and a comprehensive yearbook, the *Chanticleer*, are produced each year. These publications are under the direction of the Undergraduate Publications Board, which chooses the editors and business managers and reviews the financial budgets of all such franchised publications. The *DukEngineer*, the official student magazine of the School of Engineering, appears twice each year and contains articles on technical and semitechnical topics as well as other matters of interest to the school. WXDU 88.7 FM is the student-managed and programmed radio station, broadcasting to the Duke and Durham communities. Duke Union Community Television (Cable 13) is operated by students and produces color television programs that are broadcast throughout the campus on the University cable system. It also produces *Yearlook*, Duke's video yearbook.

Project WILD. Project WILD (Wilderness Initiatives for Learning at Duke) is a unique student organization which, through the practice of experiential education (learning through doing), attempts to ease the transition period into college for Duke students. Run entirely by students, the program strives to teach self-worth, group awareness, and an appreciation of nature. The program has three primary components. The August Course is a twelve-day backpacking expedition in western North Carolina held prior to orientation. The House Course is taught each spring semester and includes a seven-day expedition. The Ropes Course Program is a two- to four-hour experience for groups or individuals and is available to the university community year round.

Health, Physical Education, and Recreation

Besides offering a variety of classes (see the chapter "Courses of Instruction"), the Department of Health, Physical Education, and Recreation also sponsors numerous programs for all students in intramurals, sports clubs, and recreation.

The Intramural Sports Program provides an opportunity for every student to participate in organized recreation competition in forty-nine activities. The program is comprised of four major areas: men's intramurals, women's intramurals, co-rec intramurals, and recreation programs. It is open to all graduate and undergraduate students of Duke University. Participation, not skill, is a major factor that is emphasized in the program.

Thirty-two sports clubs have been chartered by Duke students for those with similar interests to participate in competition and recreational activities. Clubs vary from those which compete with clubs of other universities, such as soccer, rugby, and ice hockey, to those of a more recreational nature such as cycling, and sailing, and one which yearly presents several performances, the water ballet club.

The university's many recreational facilities, available to all students, include the championship Robert Trent Jones Golf Course, tennis courts (some lighted) on both campuses, swimming pools on both campuses, three gymnasiums, a weight training room, squash and racquetball courts, outdoor handball and basketball courts, an all-weather track, numerous playing fields, jogging trails, and informal recreational areas. Tournaments in recreational sports are often organized and conducted by students. Students may reserve facilities and equipment at designated times.

Intercollegiate Athletics

The Athletic Department fosters intercollegiate athletics by striving for excellence and by providing the best possible framework within which highly accomplished student athletes can compete. The department has a dual responsibility to provide a high-quality athletic program and environment so that all students have the opportunity to compete to the fullest extent of their abilities. Duke is a member of the National Collegiate Athletic Association and the Atlantic Coast Conference (ACC). The ACC consists of Clemson, Duke, Florida State, Georgia Tech, Maryland, North Carolina at Chapel Hill, North Carolina State, Virginia, and Wake Forest.

The intercollegiate program for men includes football, soccer, basketball, cross country, swimming, fencing, wrestling, indoor and outdoor track, baseball, golf, tennis, and lacrosse. The women's athletic program provides intercollegiate competition in basketball, fencing, field hockey, golf, soccer, swimming, tennis, volleyball, indoor and outdoor track, and cross country. First-year students may participate on all varsity teams.

The director of athletics and associate director of athletics provide departmental leadership and coordinate all athletic policies with the University Athletic Council. The council consists of representatives from the undergraduate student body, the faculty, the administrative staff, the trustees, and the alumni. The council meets with the director of athletics periodically during the school year. The chairman of the council is the official university representative at national and conference athletic meetings.

Duke University Undergraduate Honor Code

An essential feature of Duke University is its commitment to integrity and ethical conduct. The honor system at Duke helps to build trust among students and faculty and to maintain an academic community in which a code of values is shared. Instilling a sense of honor, and of high principles that extend to all facets of life, is an inherent aspect of a liberal education.

As a student and citizen of the Duke University community:

- I will not lie, cheat, or steal in my academic endeavors.
- I will forthrightly oppose each and every instance of academic dishonesty.
- I will communicate directly with any person or persons I believe to have been dishonest. Such communication may be oral or written. Written communication may be signed or anonymous.
- I will give prompt written notification to the appropriate faculty member and to the Dean of Trinity College or the Dean of the School of Engineering when I observe academic dishonesty in any course.

- I will let my conscience guide my decision about whether my written report will name the person or persons I believe to have committed a violation of this Code.

I join the undergraduate student body of Duke University in a commitment to this Code of Honor.

Name

Date

Judicial System and Regulations

Duke University expects and requires of all its students full cooperation in developing and maintaining high standards of scholarship and conduct. Each student is subject to the rules and regulations of the university currently in effect, or which are put into effect from time to time by the appropriate authorities of the university. At the same time, the individual is responsible for decisions and choices within the framework of the regulations of the community, as Duke does not assume *in loco parentis* relationships.

Students, in accepting admission, indicate their willingness to subscribe to and be governed by these rules and regulations. They acknowledge the right of the university to take disciplinary action, including suspension or expulsion, for failure to abide by the regulations or for other conduct adjudged unsatisfactory or detrimental to the university.

Responsibility for prescribing and enforcing rules and regulations governing student conduct rests ultimately with the Board of Trustees of Duke University and, by delegation, with administrative officers of the University. In the undergraduate schools, and in the university as a whole, many of these rules have been established over the years by cooperative action between students, faculty, and administrative officers. Representative student organizations, such as student governments and judicial boards, and more recently, community-wide bodies of students, faculty, and administrators, have initiated proposals for policies and rules necessary to assure satisfactory standards in academic and nonacademic conduct. These proposals have been accepted by university officers and have become a substantial, if not all-inclusive, body of rules governing student life at Duke. For current regulations, refer to the *Bulletin of Duke University: Information and Regulations*.

Students in Trinity College of Arts and Sciences and in the School of Engineering constitute an undergraduate community whose members are subject to the Judicial Code of the Undergraduate Community. Violations of the code and of certain University regulations by individuals and residential or nonresidential cohesive units are adjudicated before the Undergraduate Judicial Board, composed of representatives of the student body, the faculty, and the academic administration. The Judicial Code of the Undergraduate Community, the constitution of the board, the procedural safeguards, and the rights of appeal guaranteed to students are published in the *Bulletin of Duke University: Information and Regulations* for the undergraduate community.

Student Obligations and Requirements

Students are expected to meet academic requirements and financial obligations, as specified elsewhere in this bulletin, in order to remain in good standing. Certain nonacademic rules and regulations must be observed also. Failure to meet these requirements may result in dismissal by the appropriate officer of the university.

Admission



Principles of Selection

James B. Duke, in his Indenture of Trust, requested that “great care and discrimination be exercised in admitting as students only those whose previous record shows a character, determination, and application evincing a wholesome and real ambition for life.” In this light, and in view of the institution’s limited enrollment, Duke University looks beyond the basic characteristics of academic competence possessed by the majority of applicants. It seeks, in each prospective student, regardless of race, color, religion, national and ethnic origin, gender, handicap, sexual orientation or preference, or age, not only evidence of intellectual promise and maturity of judgment, but also a degree of positive energy. Often, this energy is expressed in the form of special talents and accomplishments; it is seen consistently in a student’s determination to make creative use of the opportunities and challenges posed by Duke University.

Requirements for Application

As there are occasionally changes in admission policies or procedures after the printing deadline for the *Bulletin of Duke University: Undergraduate Instruction*, candidates are urged to consult the *Bulletin of Duke University: Information for Prospective Students* for specific admissions information, dates, and policies.

DEGREE STATUS

Although there are no inflexible requirements as to subject matter, students are urged to choose a broad and challenging high school program. At least twelve units of acceptable college preparatory work must be presented for review. Applicants to the School of Engineering are advised to take four units of mathematics and at least one unit of physics or chemistry.

All candidates for first-year standing must complete either the College Board SAT-I examination or the American College Test (ACT). Those students who choose to take the SAT should also complete three SAT-II exams, including the SAT-II Writing Subject test. Applicants for the School of Engineering should also take a SAT-II test in mathematics (level 1 or 2). Students wishing to continue study or gain course exemption in a foreign language should complete a SAT-II exam in that language. The SAT-I and SAT-II should be taken by the spring of the junior year for Early Decision and by January of the senior year for Regular Decision.

Students choosing to take the ACT will not be required to submit SAT-I or II scores; however, the ACT will be used for admission only, not for placement or exemption. The ACT should be taken by June of the junior year for Early Decision applicants and by December of the senior year for Regular Decision applicants.

NONDEGREE STATUS

Summer Session. Persons who are or were at the time of leaving their home institutions in good standing in accredited colleges or universities may be admitted for summer study only by the director of the Summer Session.

Continuing Education. Admission as a continuing education student at Duke is limited to adults who live in the Triangle area; Duke graduates; persons who will be moving into the area and plan to reside here for a substantial period of time, for family and work reasons; and local high school seniors. These students are given academic counseling by the Office of Continuing Education; they are subject to most of the regulations set forth for degree candidates.

Application Procedures

DEGREE STATUS

A *Bulletin of Duke University: Information for Prospective Students* and an application may be obtained from the Office of Undergraduate Admissions, Duke University, Box 90586, Durham, North Carolina 27708-0586. A nonrefundable processing fee of \$50 must accompany the first part of the application. Students who would like to make use of the Common Application are encouraged to do so. The Common Application should be available in secondary school guidance offices.

A personal interview at Duke is not required for admission; students who find it possible to visit campus, however, may call for an interview. Area alumni interviews are also available for most applicants when Part I of the application or the Common Application has been filed by the deadline. On-campus interviews cannot be granted from mid-December through May, when applications are under review.

Regular Decision. Candidates who wish to enter Duke as first-year students must submit a completed application no later than January 2 of their senior year in secondary school. Decisions are mailed from the university no later than April 15, and accepted candidates are expected to reserve a place in the class by May 1 with a nonrefundable deposit of \$500.

Early Decision. Students with superior credentials for whom Duke is a clear first choice may apply for Early Decision. Candidates who apply for early decision are required to sign a statement confirming their commitment to enroll at Duke if they are admitted in the early decision process and to withdraw applications from other colleges and universities as soon as they learn of their admission to Duke. Secondary school counselors and parents are also asked to sign the early decision agreement.

Students applying for Early Decision should submit a completed application by November 1. The SAT I and II or the ACT examinations must be taken in the spring of the junior year. Early Decision applicants who have not completed their standardized tests may be deferred to Regular Decision. Applicants are notified of their status—admit, defer, or deny—by December 15. Admitted students pay a nonrefundable deposit of \$500 by January 5. The credentials of candidates who are deferred are considered along with candidates for Regular Decision. Deferred students are no longer bound by the early decision agreement and are free to accept offers of admission from other colleges and universities.

This plan is designed to give well-qualified students who know Duke is their first choice a means of indicating that commitment to the University and of receiving a decision early enough to eliminate the necessity of applying to several colleges.

Midyear Admission. Midyear admission, when offered, allows a limited number of students to begin their college work a semester early or to postpone matriculation for a semester. Midyear applicants are expected to complete all the requirements for fall admission. The application deadline for new candidates is October 15; students will be notified of the decision on their applications by November 15, with the expectation that those who are accepted will reply by December 1 with a nonrefundable deposit of \$500. **Midyear admission is not offered each year and has not been offered during the last several years. Interested candidates should consult the admissions office to see if the program is offered in the coming year.**

Transfer Admission. Transfer admission from other accredited institutions may be arranged for a limited number of students each semester. Because the transcript of at least a full year of academic work is preferred by the Admissions Committee, and because transfer students are required to spend their last two years at Duke, most candidates apply to Duke preceding or during their second year of college. Candidates submit official transcripts of all work completed at other accredited colleges, high school records, scores on the Scholastic Aptitude Test, and employment records if there has been an extended period of employment since graduation from secondary school, along with completed application forms. See the section on transfer credit in the chapter "Academic Procedures and Information."

September (fall semester) transfer students meet an April 1 deadline for a completed application, learn of their decisions by May 15, and respond to the university by June 1 with a nonrefundable deposit of \$400 or \$500, if housing is requested. January transfer students submit a completed application by October 15, learn of their decisions by November 15, and reply to the University by December 1.

NONDEGREE STATUS

Summer Session. Application forms and schedules of courses may be obtained by writing or calling the Office of the Summer Session, Box 90700, Duke University, Durham, North Carolina 27708-0700, (919) 684-2621. No application fee is required.

Continuing Education. Applications may be obtained from the Office of Undergraduate Admissions and must be returned to that office, accompanied by a \$35 application fee, by August 1 for the fall semester and by December 1 for the spring semester.

A certain grade point average over four courses must be attained before a nondegree student may apply for degree candidacy. More detailed information on nondegree course work through Continuing Education is available from the Office of Continuing Education, Box 90700, Duke University, Durham, North Carolina 27708-0700.

READMISSION OF FORMER STUDENTS

A student who desires to return, following withdrawal from college, should apply to the appropriate college or school. (See the section on readmission procedures in the chapter "Academic Procedures and Information.")

Financial Information



Tuition and Fees*

No college or university can honestly state that an education at the college level is inexpensive. Fees paid by students cover less than half the cost of their instruction and the operation of the university. Income from endowment and contributions from alumni and other concerned individuals meet the balance and assure each student the opportunity to pursue an education of unusually high quality.

Students are urged to give their attention first to the selection of institutions which meet their intellectual and personal needs, and then to the devising of a sound plan for meeting the cost of their education. This process will require an in-depth knowledge of both the university's financial aid program and the resources of the student's family. A brochure describing in detail the various forms of financial aid may be obtained from the Office of Undergraduate Financial Aid, Box 90397, Duke University, Durham, North Carolina 27708-0397.

Estimated Expenses.* Certain basic expenditures, such as tuition, room, and board, are considered in preparing a student's budget. These necessary expenditures, with a reasonable amount allotted for miscellaneous items, are shown below:

	<i>Academic Year, 1994-95</i> (two semesters)	<i>Two Summer Terms, 1994</i> (one semester equivalent)
Tuition		
Trinity College		
-Returning	\$17,540	\$5,136-5,992
-Entering	\$18,590	\$5,136-5,992
Engineering		
-Returning	\$18,685	\$5,136-5,992
-Entering	\$19,210	\$5,136-5,992
Residential Fee		
Single Room	\$4,160-4,736	N/A
Double Room	\$3,133-3,570	\$745
Food		
100% board plan	\$3,200	\$1,150†
75% board plan	\$2,620	\$700†
Books and Supplies	\$624	\$290
Student Health Fee	\$378	\$116

It should be realized that additional expenses will be incurred which will depend to a large extent upon the tastes and habits of the individual. The average Trinity College student, however, can plan on a budget of approximately \$26,670 for entering students and \$25,620 for continuing students. The budget estimate for the summer (two terms, one semester equivalent) is \$7,850. These budgets are all-inclusive except for travel costs and major clothing purchases.

*The figures in this section are projections and are subject to change.

†These estimates are for use with debit accounts.

Registration Fees and Deposits for Fall and Spring. On notification of acceptance, students are required to pay a nonrefundable first registration fee of \$40, a one-time transcript processing fee of \$30, and to make a deposit of \$430. The deposit will not be refunded to accepted applicants who fail to matriculate. For those who do matriculate, \$100 of the deposit serves as a continuing residential deposit for successive semesters, \$30 covers the transcript fee, and the remaining \$330 serves as a continuing registration deposit.

Late Registration. Continuing students who fail to register during the registration period must pay a fee of \$50 to the bursar.

Part-Time Students. In the regular academic year, students who register for not more than two courses in a semester are classified as part-time students. Part-time students will be charged at the following rates: one course, returning students, \$2,192.50, entering students \$2,323.75 (for engineering courses, \$2,335.75 and \$2,401.25); half course, returning students \$1,096.25, entering students \$1,162 (for engineering courses, \$1,168 and \$1,200.75); quarter course, returning students \$548, entering students \$581 (for engineering courses, \$584 and \$600.50). Registration for more than two courses requires payment of full tuition. Graduate students registered for undergraduate courses will be assessed three units for nonlaboratory courses and four units for laboratory courses. Men and women in nondegree programs who are being considered for admission to degree programs, as designated by the Office of Continuing Education, pay fees by the course whether the course load is one, two, or three courses.

Auditing one or more courses without charge is allowed for students paying full fees, provided that the consent of the instructor is obtained. Students who are enrolled for one or two courses may audit other courses by payment of \$219 for returning students, \$232.50 for entering students (\$235 and \$240.25 for engineering) for each course audited. With the consent of the appropriate instructor and the director of Continuing Education, graduates of Duke may audit undergraduate courses for the above payment per course.

Payment of Accounts for Fall and Spring. The Office of the Bursar will issue invoices to registered students for tuition, fees, and other charges approximately four to six weeks prior to the beginning of classes each semester. The *total amount due* on the invoice is payable by the invoice late payment date which is normally one week prior to the beginning of classes. Inquire at the bursar's office, (919) 684-3531, if an invoice has not been received three weeks prior to the first day of classes, so that payment can be forwarded while a duplicate invoice is issued to document the balance owed. *As part of the admission agreement to Duke University, a student is required to pay all invoices as presented.* If full payment is not received, a late payment charge as described below will be assessed on the next invoice and certain restrictions as stated below will be applied. Failure to receive an invoice does not warrant exemption from the payment of tuition and fees nor from the penalties and restrictions. Nonregistered students will be required to make payment for tuition, fees, required deposits, and any past due balance at the time of registration.

Monthly Payment Option. The Monthly Payment Option Plan allows students and their parents to pay all or part of the academic years expenses in ten equal monthly payments from July 1 to April 1. The only cost is an annual, nonrefundable fee of \$100. The participation fee can be paid by Visa or Mastercard. Payments may be made by check or by bank draft. Questions regarding this plan should be directed to Tuition Management Services, 1-800-722-4867 or 401-849-1550. At renewal, the plan can be extended to twelve months. The monthly payments can be increased or decreased without additional cost.

Late Payment Charge. If the total amount due on an invoice is not received by the invoice late payment date, the next invoice will show a penalty charge of 1 1/4 percent per month assessed on the past due balance regardless of the number of days past due. The past due balance is defined as the previous balance less any payments and credits

received on or before the late payment date and also any student loan or scholarship memo credits related to the previous balance which appear on the invoice.

Restrictions. An individual will be in default of this agreement if the total amount due on the student invoice is not paid in full by the invoice late payment date. An individual who is in default will not be allowed to register for classes, receive a copy of the academic transcript, have academic credits certified, be granted a leave of absence, or receive a diploma at graduation. In addition, an individual in default may be subject to withdrawal from school.

Fees for Study Abroad. Students who register to study abroad on programs administered by institutions other than Duke University will pay the tuition and fees of the administering institution. There will be a fee of \$1,500 per semester, or \$750 per each summer session, payable to Duke University to maintain a student's enrollment at Duke.

Tuition and Fees for Summer Session. Tuition for undergraduates is \$1,284 for each 3 semester hour (s.h.) course, \$1,712 for each 4 s.h. course, \$856 for each half course (2 s.h.), and \$2,568 for each one and one-half course program (6 s.h.) offered at the Marine Laboratory.

Tuition for graduate students taking an undergraduate course is as indicated above.

Health Fee. All Duke students and all full-time non-Duke students are required to pay \$58 per term. All students at the Marine Laboratory are required to pay \$50 per five-week registration period.

Music Fee. A fee of \$135 will be charged for Music 81 and 85. A fee of \$270 will be charged for Music 91 and 95.

Auditing Fees. With permission of the instructor and the director of the Summer Session, students registered for a full course program (two courses) may audit one nonlaboratory course except a physical education and dance activity course, a studio art course, an applied music course and foreign programs. No extra charge is made.

Students carrying less than a full course program may be granted permission by the instructor and the director of the Summer Session to audit a course (the above exceptions apply) but must pay half the university fee for the course.

Late Fee. Students who fail to register and pay all tuition and fees before five full working days prior to the beginning of the term will pay an extra charge of \$25.

Payment of Tuition and Fees. The university does not mail statements in time to meet summer session tuition deadlines. All summer tuition and fees (which students must calculate from the information above) and any past due balance should be paid in the Office of the Bursar (101 Allen Building) at least five full working days prior to the beginning of the term (see Summer Session calendar). Students paying by mail may forward payment to the Office of the Bursar, 101 Allen Building, Duke University, Durham, North Carolina 27706. Students who fail to pay tuition and fees and/or otherwise fail to clear with the bursar by the end of the drop/add period will be withdrawn from their courses. These withdrawn students will be billed the health fee and an administrative withdrawal fee of \$150 per course (\$75 per half-course) for which they were registered. (See the section on Refunds and Administrative Withdrawal Charges concerning penalties in this chapter). Students who, subsequent to withdrawal, clear with the bursar may, with written permission of their academic dean, be reinstated in their classes as originally registered. The administrative withdrawal fee will stand and the student will be liable for full tuition and fees. Students who are unable to meet these deadlines should consult with the bursar and their academic dean prior to the deadline.

Transcripts. Requests for transcripts of academic records should be directed to the associate registrar. Ten days should be allowed for processing. Transcripts may be withheld for an individual whose student loan account is past due.

Duke Employees. With the permission of their supervisors, employees may, through the Office of Continuing Education and University Summer Programs, take up to two courses for credit or audit during any one semester or one during a summer term. A formal application for credit course work must be submitted by August 1 for the fall semester or December 1 for the spring semester. No formal application is required for auditing. Half-time employees with one or more years of service who receive permission to take such courses will be charged one-half the tuition rate shown above for part-time students during the fall and spring and one-half of the summer tuition rate. This benefit applies only to nondegree work. Full-time (thirty or more hours a week) employees with two or more years of service who receive permission to take such courses will be charged one-tenth the tuition rate for credit course work and will be permitted to audit at no charge. This benefit continues after degree candidacy has been attained. Eligible employees should consult the Benefits Office, 705 Broad Street (919) 684-6723, at least one week in advance of payment date to obtain the appropriate tuition voucher. The Director of Continuing Education and University Summer Programs is available to advise Duke employees on educational matters (919) 684-6259.

Living Expenses*

Housing for Fall and Spring. In residence halls for undergraduate students the housing fee for a single room ranges from \$4,160 to \$4,736 for the academic year; for a double room, the fee ranges from \$3,133 to \$3,570 per occupant.

To reserve university housing for the fall semester, returning students who are eligible for and wish to occupy such housing must make a \$50 prepayment of the housing fee at a designated time during the spring semester.

Detailed information concerning the student's obligations under the housing contract and the consequences of failure to comply are published in the *Bulletin of Duke University: Information and Regulations*.

Housing for Summer. For detailed information on types and costs of accommodations available at Duke University for the Summer Session write: Department of Housing Management, 218 Alexander Avenue, Apartment B, Durham, North Carolina 27705.

Food and Other Expenses. Duke Dining Services and Duke University Store operations are located on campus to serve the needs of the Duke community. The university identification card, known as the DUKECARD, can be used to gain access to prepaid accounts and make purchases in many Duke University facilities.

There are two accounts: the dining account, used to purchase food items in Duke Dining Services and Duke Stores operations; and the flexible spending account, used to purchase any goods or services from Dining Services, Duke Stores, and other operations.

A dining account is required for all undergraduate students who live in the residence halls. The five declining balance plan levels (Plan A-Plan E) range from \$910 to \$1600 per semester. The flexible spending account is optional and may be set for \$25 or more. Additional funds may be added to either account at any time. An optional summer dining plan is provided in three plan levels ranging from \$150 to \$595 per six-week summer term.

Information regarding these accounts is sent to matriculating students. For more information about campus retail and food facilities, see the chapter "Campus Life" in this bulletin.

*The figures contained in this section are projections and are subject to change prior to the beginning of the fall 1994 semester.

Fall and Spring Refunds

In the case of withdrawal from the university, students or their parents may elect to have tuition refunded or carried forward as a credit for later study according to the following schedule:

Withdrawal	Refund
Before classes begin	Full amount
During first or second week	80 percent
During third, fourth, or fifth week	60 percent
During sixth week	20 percent
After sixth week	None

Tuition charges paid from grants or loans will be restored to those funds on the same pro rata basis and will not be refunded or carried forward. In the event of death, a full tuition, fees, and residence hall refund will be granted. In case of a call to military service, a full semester's tuition, full purchase price of textbooks from the university's book store, and the pro rata amount of the room charge will be refunded. The outstanding balance of the food service plan will be refunded in case of military service or death.

In the case of dropping special fee courses (e.g., music, art, golf), or of part-time students dropping audit courses, a full refund will be granted students during the drop-add period. Students changing status to part-time are required to request permission at the time of preregistration; therefore, no refunds are granted during the drop/add period or subsequently for changes which involve carrying less than a full-time load.

The registration deposit will be refunded to students whom the university does not permit to return, who graduate, or who request the refund prior to registration, thereby indicating their intention not to return for the following semester. The registration deposit will not be refunded to students who register for the following semester but fail to enter. Arrangements for refund of the \$100 residential deposit are described in the housing contract.

The remaining balance is any registration deposit applicable to a graduated student who did not reside on campus in the semester preceding graduation will be refunded within four weeks following graduation. The remaining balance of both housing and registration deposits applicable to a graduated student who did reside on campus in the semester preceding graduation will be refunded within seven weeks following graduation.

Summer Administrative Withdrawal Charges and Refunds*

Drop or Administrative Withdrawal Charges. Students who will not be attending a summer term or course for which they have registered (i.e., have scheduled a course through the telephone registration system) must officially drop the course(s) prior to the beginning of the term whether or not they have paid tuition and fees. (See the section on course changes for the summer term in the chapter "Academic Procedures and Information.") Students who fail to drop the course(s) prior to the beginning of the term will be charged \$150 per course (\$75 per half-course) plus the health fee, and will receive a WE on the transcript.

Refunds (Except Foreign Programs). Students who will not be attending a summer term or course for which tuition and fees have been paid are eligible for refunds following these policies:

1. There is no refund of tuition and fees if the student drops a course(s) or withdraws from the term after the third day.

*This policy does not apply to foreign program students.

2. Full tuition less \$150 per course (\$75 per half-course) is refunded if the student officially drops a course(s) or withdraws from the term during the first three days. The health fee is not refunded. (There is no charge for drop/adds that result in no change in course load in the same term.)
3. Full tuition and fees are refunded if the student officially drops a course(s) or withdraws from the term before the first day.

Student Aid

Duke University is strongly committed to its financial aid program and, for the four years of undergraduate enrollment, will meet 100 percent of the demonstrated need of each eligible admitted student. The university's aid program includes both merit and need-based scholarships, work-study, the Federal Pell grant program, the Federal Perkins Loan (formerly National Direct Student Loan Program), and the Federal Stafford Student Loan Program (formerly Guaranteed Student Loan Program). Since admissions decisions are made without reference to a student's application for aid, students needing assistance are strongly encouraged to apply for financial aid at the same time as for admission. Students receiving financial aid will be notified at the same time that they are offered admission.

For the student with demonstrated need, the net cost of an education at Duke University will generally be no greater than that for attendance at any college or university. It is the intention of the Office of Undergraduate Financial Aid to set each award at a level consistent with a student's ability to meet the costs of attending Duke University. This will be done by taking into consideration the contribution that can reasonably be expected from the student, the family, and any available outside sources. During the current academic year, over forty percent of the student body receives more than twenty-one million dollars in aid of various types.

Financial Aid for Entering Freshmen. Candidates should initiate their application for financial aid concurrently with their application for admission during the fall semester of their senior year in secondary school. Instructions concerning the specific requirements and deadline dates will accompany application materials. Two financial aid forms, the Free Application for Federal Student Aid (FAFSA) and the Financial Aid Form (FAF) must be submitted to the College Scholarship Service. In divorce cases, the University requires both parents to submit financial information. The custodial parent should submit an FAF and FAFSA. The noncustodial parent can submit the Divorced/Separated Parent's Statement which may be obtained from either the high school guidance office or the Financial Aid Office. A copy of all pages, including schedules and attachments, of both parents' and student's current federal income tax form must be submitted to the Financial Aid Office on or before May 1. Information provided on the FAF will be verified through the use of the tax return.

Financial aid recipients wishing to operate a motor vehicle on campus must first register it with the Financial Aid Office. As an automobile represents an asset, the value of a financial aid recipient's car will be considered in the estimation of a student's need. As a general rule, a student's annual contribution will be increased by 35 percent of the value of the car.

Renewal of Financial Aid after the Freshman Year. Each year students must file an application for renewal of financial aid. This application must include a new Financial Aid Form, a new Free Application for Federal Student Aid, and a copy of all pages, including schedules and attachments, of the parents' and student's current federal income tax return and a Duke Application for Financial Aid. Application packets may be picked up in the Financial Aid Office in mid-December. The deadline for applications is April 16. Failure to meet this deadline may affect the type and amount of aid offered. All qualified students may receive need-based aid for up to eight semesters. Under certain circumstances consideration will be given to a ninth semester of eligibility.

To have financial aid renewed, a student must meet the continuation requirements outlined on pages 23, 24, and 35, as appropriate. Students not qualifying for financial aid due to their inability to meet these requirements may appeal directly to the Financial Aid Office. Students holding merit scholarships are required to maintain an average considerably higher than the minimum required for need-based financial aid recipients. Specific details regarding retention standards are outlined on page 106 and will be provided to scholarship winners.

Summer School Financial Aid. Financial aid is generally available for each summer session. Interested students can obtain specific details as to available funding and an application through the Financial Aid Office in March of each year.

Types of Financial Aid. Gift scholarships or grants, long-term loans, and employment are integral parts of the financial aid program, and some portion of the aid offered an undergraduate is normally in each of these forms.

The work-study opportunity and loan(s) offered as financial aid are considered to be the self-help portion of the award. The standard aid package at Duke provides that the first \$1,700 to \$5,000 of each student's need be awarded in the form of self-help funds. Funds awarded in excess of this amount will generally be grant funds. This combination of university grant funds and opportunities for self-help enables Duke to extend its resources to a larger number of deserving students.

Duke has a number of scholarships based on merit which are available from personal endowments and corporations. Most are intended for entering freshmen, whereas a few are awarded to upperclass students. These scholarships may be based on achievement in a particular field or on an outstanding overall record.

Gift Scholarships. The following are among the named gift scholarships offered through Duke University. Where specified, these scholarships are renewable for four (4) years of undergraduate study for those students meeting the following academic standards:

Renewable merit scholarships will be continued for freshmen who complete the first year of studies with a 2.8 average or higher. Upperclass students must complete each academic year with a 3.0 average or higher. Students failing to meet these standards will be placed on probation for one semester during which they must maintain a 3.0 average or higher. Failure to maintain a 3.0 average or higher in subsequent semesters will lead to cancellation of the scholarship.

Angier B. Duke Memorial Scholarships. The Angier B. Duke Memorial Scholarships, competitively awarded on the basis of academic merit, have been established to encourage the intellectual achievement of men and women by recognizing those who possess outstanding academic and leadership abilities. Candidates are selected on the basis of intellectual performance, creative talent, and promise of being eventual leaders in whatever field of endeavor they choose. The scholarship is a four-year program (eight semesters), and a student's continuation in the program is contingent upon good academic performance. All 1993-94 freshman scholarship holders received \$16,720 if enrolled in Trinity College of Arts and Sciences, and \$17,810 if enrolled in the School of Engineering. Students demonstrating additional need will receive a grant from Duke University funds up to the amount needed. All Angier B. Duke Scholars participate in a six-week summer study program at Oxford University in England after the junior year. Under the Oxford program the scholarship pays tuition, single room accommodation, full board, designated excursions for all scholars, and an allowance for transatlantic air fare between New York and London. Those choosing not to participate in the Oxford program are eligible for a \$2,000 grant for an approved independent project. At least one of the four years of the scholarship could be used abroad on an approved program.

W. N. Reynolds Memorial Scholarships. Recipients of these awards are students with outstanding ability and/or need who show promise of constructive leadership. In considering candidates for the awards, consideration will be given in the following order: (1) children of employees of R. J. Reynolds Tobacco Company or any of its affiliates or subsidiaries; (2) children of families residing in Forsyth County, North Carolina; and (3) other candidates who are residents or natives of North Carolina. There are a number of awards available for each freshman class with a minimum value of \$500.

Lionel Hampton Scholarship. This award of \$500 (not renewable) is given to an incoming freshman who demonstrates high proficiency in a musical instrument and strong potential in jazz performance.

United Methodist Scholarships. A number of United Methodist Scholarships are available on a basis of demonstrated need to Methodist students who have given evidence of leadership in their local Methodist Youth Fellowship groups.

Alice M. Baldwin Scholarships. One or more of these scholarships, varying in amount from \$500 to \$2,500, are awarded to women who are rising seniors in Trinity College of Arts and Sciences on the basis of scholarship, character, leadership, and need.

Panhellenic Scholarship. A scholarship of approximately \$1,000 is awarded to an upperclass woman in Trinity College of Arts and Sciences on the basis of scholarship, character, leadership, service, and need.

J. A. Jones Memorial Scholarships. These scholarships, sponsored through the Jones Fund for Engineering, are awarded to engineering students whose outstanding academic and personal qualifications suggest that they will become leaders in a technological society. The awards range from \$1,000 to \$3,000, depending on each recipient's financial need.

Robert H. Pinnix Scholarships. The Robert H. Pinnix Scholarships are awarded annually to two upperclassmen enrolled in the Duke School of Engineering. The award is based upon demonstrated ability, excellence in engineering, and financial need.

Richard Miles Thompson Scholarships. The Richard Miles Thompson Scholarships are awarded annually to two upperclass students enrolled in the School of Engineering. The awards are based upon academic merit and demonstrated financial need.

The Mary Duke Biddle Scholarship in Music Composition. This scholarship with a stipend of up to \$3,500 per year is available to a member of each entering class. It is renewable annually as long as the student meets the required standards for renewal. Students wishing to apply for this award will be required to submit examples of their composition. Eligibility is limited to students planning to major in music.

The William O'Connor Memorial Scholarship. This music scholarship of up to \$2,500, established by the Mary Duke Biddle Foundation in honor of William O'Connor and in appreciation for his many years of service to the foundation, is awarded to student of a string instrument or organ.

The A. J. Fletcher Scholarship. This scholarship of \$7,500 is offered annually to an incoming first-year student, who intends to major in music and who can demonstrate, by tape or audition, talent and achievement in instrumental or vocal performance, or in the case of composition, by submission of a representative portfolio. It is renewable annually as long as the student makes satisfactory progress.

Air Force ROTC College Scholarship Program. Students can apply for three-year scholarships during their freshman year and two-year scholarships during their sophomore year. Scholarships are available to qualified students who major in certain scientific or engineering fields. The scholarships include tuition, fees, and textbook reimbursement, plus a \$100 per month tax-free allowance.

Army ROTC Scholarship Program. All freshman and sophomore students are eligible to apply for Army ROTC scholarships. Awarded without regard to academic major, these grants pay tuition, fees, and textbook/equipment costs in addition to providing a tax-free monthly stipend of \$100 for the balance of the student's normal period to graduation. Commissioned service, following graduation, can be either on active duty or with the reserve forces. Additional information concerning Army ROTC scholarships is available from the professor of military science.

Navy ROTC College Scholarship Program. This program provides for up to four years' tuition and textbooks, laboratory fees, and a \$100 per month stipend. These scholarships, based upon academic achievement, leadership potential, and overall performance, can be awarded at any stage of the student's college career through either a nationwide selection process or by the Professor of Naval Science at the university. In addition, two other two-year scholarships are available to rising juniors: one leads to a career in nuclear power, and the other follows a summer attendance at the Naval Science Institute at Newport, Rhode Island. For further information on any of the above scholarship programs, contact the professor of naval science.

The Huguenot Scholarship. One scholarship of \$1,000 per year is available from the Huguenot Society of America to a descendant of a Huguenot.

Reginaldo Howard Scholarships. These scholarships, awarded annually to freshman minority students, are provided to honor the late Reggie Howard, first black president of the student government. Seven scholarships for \$6,000 are awarded each year. Scholarships are available for the four years of undergraduate study as long as the student maintains the academic average specified for renewal.

The Anne McDougall Memorial Award. The Anne McDougall Memorial Award for Women is awarded each year to one woman student studying psychology or a related field. Administered through women's studies, this \$1,000 award is intended to provide encouragement and support for women who wish to pursue academic study and continue in the area of human service.

The Janet B. Chiang Memorial Scholarship Fund. This fund was created by the family and friends of Janet B. Chiang. An award is made annually to a student who has demonstrated strong leadership qualities and a strong interest in his or her Asian cultural heritage.

The Beth Gotham Semans Drama Scholarships. These awards are made annually to currently enrolled undergraduate students who have been and continue to be active in drama, with preference given to black and other minority students. Applicants need not be drama majors but must demonstrate significant involvement in dramatic activities. Awards range from \$500 to \$1,000. Applications should be made to the director of the Drama Program.

Emma A. Sheaffer Drama Scholarships. These scholarships are awarded to talented prospective drama students who would not be able to attend Duke University without financial assistance. Awards shall be made to a single individual or to several qualified students in need, with first preference to students from the geographic New York metropolitan area. Awards range from \$1,000 to \$5,000. Interested incoming students should apply to the director of the program.

The Steven and Toby Korman Drama Scholarships. The scholarship shall be awarded annually to a student(s) who has demonstrated exceptional talent and ability in the field. Awards range from \$1,000 to \$5,000. Interested students should apply to the director of the program.

Kohler Scholarships in Drama. Several awards each year ranging from \$250 to \$1,000 are given to students active in the Drama Program. Awards are based on a nondiscriminatory basis with regard to color, sex, and religion. Interested students should apply to the director of the program.

The Roger Alan Opel Memorial Scholarship. A grant is awarded annually to a Duke student who will spend a year of undergraduate study at a British university. The student is selected on the basis of intellectual curiosity, academic ability, and financial need. The award was established by the parents of Roger Alan Opel, a senior at Duke University who was killed in November, 1971.

Alumni Endowed Scholarships. Three \$8,000 per year Alumni Endowed Undergraduate Scholarships are awarded to students who demonstrate superior academic ability and leadership potential. These awards are renewable annually for those meeting the stated requirements. Although not restrictive, preference is given to children of alumni.

Scholarships for North Carolina Residents

The Benjamin N. Duke Scholarship Fund. Established by the Duke Endowment to honor Benjamin N. Duke, this fund is intended to encourage the enrollment of students from North Carolina and South Carolina.

The Benjamin N. Duke Leadership Award. As part of the Benjamin N. Duke Scholarship Fund, these awards recognize and encourage leadership potential and community involvement of students from North and South Carolina. Ten scholarships, valued at 75 percent of tuition, are awarded annually.

The Benjamin N. Duke Scholarship Fund also provides a number of grants which replace what would normally be the loan portion of need-based awards received by students from North Carolina and South Carolina. This fund can allow need-based aid recipients from the Carolinas to graduate debt free following the eight standard semesters of enrollment.

Trinity Scholarships. Awarded to North Carolinians of exceptional ability, these scholarships are named to honor the fact that Duke University was originally named Trinity College. Trinity scholarships provide each winner an award equal to the value of tuition, fees, room, board, and the cost of a summer program.

North Carolina Math Contest. Upon enrolling at Duke, the top student finishing in the top ten in the North Carolina Math Contest taken as a high school senior is eligible to receive a scholarship equal to the amount of tuition. This scholarship is available for each of the four years of undergraduate enrollment as long as the student maintains the specified average. Winners must have applied to and been accepted by Duke University.

The Perry Family Scholarship. Awarded to students from Winston-Salem and the Forsyth County area, this scholarship, valued at \$5,000, is awarded every other year. Recipients of the scholarship will be required to demonstrate high academic achievement as well as leadership and/or involvement in extracurricular activities. The scholarship is available for four years if the student meets the specified academic requirements.

J. Welch Harriss Scholarships. Recipients of these scholarships will receive \$1,000 per year without reference to need. If demonstrated need exceeds \$1,000, then the scholarship will be adjusted accordingly. These awards are made to entering freshmen who have achieved outstanding academic records. They are renewable each year as long as the student maintains the required average. Consideration will be given in the following order: (1) students from High Point, North Carolina; (2) students from Guilford County, North Carolina; and (3) students from North Carolina.

Alyse Smith Cooper Scholarships. Each year scholarships of various amounts are awarded to students demonstrating both merit and need. Preference is given to students from Alamance County, North Carolina.

Braxton Craven Endowed Scholarships. Recipients of these scholarships will receive an amount equal to the current tuition at Duke. Braxton Craven scholars will be chosen on the basis of outstanding academic and extracurricular achievement and need. First preference is given to students from North Carolina. The scholarships are approved on a continuing basis, provided that the recipient complies with the specified academic requirements.

The John M. and Sally V. Blalock Beard Scholarship. These scholarships are awarded annually to outstanding students from the Wake County area of North Carolina who major in English or the history of the United States. These awards are based on financial need, scholarship, character, and academic achievement.

North Carolina Legislative Tuition Grant. The North Carolina General Assembly has established a program of tuition grants available to North Carolina residents who are full-time students at private colleges and universities in the state of North Carolina. The grant for each eligible student is approximately \$1,150 per year. Applications will be mailed to all eligible students during the summer. In the case of a need-based financial aid recipient, this grant reduces a student's tuition and therefore his budget. All qualified need-based aid recipients are required to apply for this grant.

State Contractual Scholarships for Needy North Carolinians. Funds provided by the state of North Carolina through the Legislative Grant Program are distributed to needy North Carolinians qualifying for the State Contractual Scholarship Program. Application is made through the College Scholarship Service's Financial Aid Form.

Loans. The loan programs which are available to students through Duke University are listed below:

Federal Perkins Loan. Loan funds supplied by the federal government and Duke University through Part E of Title IV of the Higher Education Act of 1965 are available to qualified students. Repayment of loans under this act normally begins nine months after the student is graduated or leaves college, with complete payment scheduled within a ten-year period. Interest accrues at the rate of 5 percent annually, commencing nine months after the borrower ceases to be at least a half-time student at an institution of higher education. This loan is part of the student's financial aid award.

Federal Stafford Student Loan Program. Loans under the Federal Stafford Student Loan program are available from banks or other incorporated state lending agencies. Duke University can arrange an alternate lender for students who are unable to obtain these loans through their home state agencies or local banks. Need as established by the federal government's formula will be considered in the university's decision regarding applications. The annual limit on a loan, which has a variable interest rate that is capped at 9 percent, is \$2,625 for freshmen, \$3,500 for sophomores, and \$5,500 for juniors and seniors. Repayment begins six months after the student leaves school.

Students may apply for Stafford loan funds by submitting a loan application directly to the Financial Aid Office. In addition, loan applicants must submit the Free Application for Federal Student Aid to the College Scholarship Service. Additional information about this loan program may be obtained from the Undergraduate Financial Aid Office.

Federal Parents' Loan for Undergraduate Students Program. Parents may borrow up to the cost of education less financial aid through the Federal Parent Loan for Undergraduate Students (PLUS) program. Repayment of these loans begins sixty days after loan disbursement. Interest is based upon treasury bill rates but will be no higher than 10 percent and begins to accrue at the point repayment begins. Interested parents should contact their home state lending agency or the financial aid office.

Federal Unsubsidized Stafford Loan. All undergraduate students, regardless of need, are eligible to borrow an Unsubsidized Stafford Loan. The loan limits and the interest rate are the same as for the subsidized Stafford Loan described above. Although repayment of the principal begins six months after the student leaves school, interest payments begin 45 days after the first disbursement of the loan.

Share Loans. "Share" is a supplemental educational loan program developed specifically to help families meet the costs of higher education. Credit-worthy families, regardless of income, may be eligible to borrow through this program. Annual loan amounts range from \$2,000 to \$20,000 per year with a cumulative borrowing limit of \$80,000. The interest rate is variable, and Share offers several repayment options.

Children of Methodist Ministers. Children of ministers in the North Carolina and the Western North Carolina Annual Conferences of the United Methodist Church may be eligible to receive a partial tuition grant of \$750 per semester for a maximum of eight semesters of undergraduate study at Duke University. Eligibility is met by the parent

being in a regular pastoral appointment and resident in one of the conferences. When the parent is in a special appointment and resident in one of the conferences, eligibility will be determined on an individual basis, depending upon the nature of the appointment. In all cases the decision of the university will be final.

Employment. Most financial aid recipients are offered a job as part of their aid package. These jobs require between ten and fifteen hours a week and provide an average stipend of \$1,700. The money is paid directly to the student. The Office of Undergraduate Financial Aid maintains part-time employment listings for the campus and Durham area. All students interested in working during the school year should inquire at Student Employment in the Financial Aid Office at the beginning of the semester. Every effort will be made to help students find jobs consistent with their interests.

Duke University also expects that students receiving financial aid will work during the summer. In the year before entering college, a freshman should save a minimum of \$1,400 for use during the first year of college. In subsequent years, minimum student earnings will be \$1,700 for sophomores, \$1,800 for juniors, and \$1,900 for seniors. These figures are viewed as estimates and are revised consistent with actual earnings.

Duke University offers subsidized employment opportunities to many students not qualifying for need-based financial aid. Interested students should submit the Financial Aid Form and FAFSA to the College Scholarship Service.

Financial Plans. There are three plans available to assist parents and students in fulfilling financial obligations. More information about each described can be obtained from the Office of Undergraduate Financial Aid.

Tuition Plans. Many families finance a college education with the assistance of an insured tuition payment plan regardless of whether they receive financial assistance from Duke. Although these plans are sponsored by a number of private firms, the university refers parents to plans provided by the Richard C. Knight Insurance Agency, Inc. The company provides the university with the full sum required each semester and arranges a schedule for monthly repayment by the subscribing families. The schedules for repayment vary with the program offered by the company. Additional information on this particular tuition payment plan may be obtained by writing to Richard C. Knight Insurance Agency, Inc., Insured Tuition Payment Plan, 53 Beacon Street, Boston, Massachusetts 02108.

Tuition payment plans are also available through the Tuition Plan, Concord, New Hampshire 03301. Each year the Tuition Plan will send information to all students.

Payment Plans. The university is pleased to offer a number of payment plans. These include a ten-month plan and a plan by which tuition for four years is locked in at the freshman rate. Interest is established annually with payments being made in forty-four equal installments.

Additionally, parents may pay four years of tuition, using the freshman rate, at one time. Details of these programs will be forwarded to students at the time of admission.

Loan Plans. Duke is pleased to offer loans through the Duke University Family Loan Plan and A Better Loan for Education (ABLE) plan. These two separate university loan plans offer different terms but allow families to extend payments over as long as fifteen years.

Of additional assistance is the SHARE Loan Program. Using this program, parents may borrow between \$2,000 and the cost of education annually to meet their children's costs of education. Repayment may be made over twenty years.

Courses of Instruction



Definition of Terms

Courses taught in 1992-93 or in 1993-94 or scheduled for 1994-95 are included in this chapter with full descriptions. Additional courses, which were offered prior to 1992-93 and are likely to be taught in the future, are listed separately by number and title only under the heading Courses Currently Unscheduled. For courses which will be offered in 1994-95, consult the Official Schedule of Courses.

Introductory level courses are numbered below 100; advanced level courses are numbered 100 and above. Courses numbered 1 through 49 are primarily for first-year students; courses numbered from 200 through 299 are primarily for seniors and graduate students. (See the section on course load and eligibility in the chapter "Academic Procedures and Information.")

Odd-numbered courses are usually offered in the fall semester, even-numbered courses in the spring semester. Double numbers separated by a hyphen indicate that credit is contingent upon completion of both courses. Double numbers separated by a comma indicate that although the course is a year-long course, credit may be received for either course or both courses.

The following symbols, suffixed to course numbers, identify the small group learning experiences: *S*, seminar; *P*, preceptorial; *T*, tutorial; *D*, discussion section. The *L* suffix indicates that the course includes laboratory experience. *C-L*: denotes a course that is cross-listed or a program under which a course is listed.

The following symbols, suffixed to course titles, identify the area of knowledge to which a particular course has been assigned in the curriculum: *AL*, arts and literatures; *CZ*, civilizations; *FL*, foreign languages; *NS*, natural sciences; *QR*, quantitative reasoning; *SS*, social sciences.

The following portion of this bulletin, arranged alphabetically, includes courses of departments, programs, sections, and institutes, as well as categories of courses. Details are provided in the individual entries, which indicate whether a major is available in that particular field. A certificate, offered in some programs, is not a substitute for a major but is a supplement, confirming that a student has satisfied the requirements of that program.

Trinity College of Arts and Sciences

Professor White, *Dean of Trinity College and Vice-Provost for Undergraduate Education*; Senior Associate Dean for Administration Wilson (Social Sciences); Associate Deans Bryant (Social Sciences), Nijhout (Natural Sciences), and Wittig (Humanities); Assistant Deans Johns (Study Abroad), Keul (Pre-Majors), Lattimore (Social Sciences), Ruderman (Summer Sessions), and Singer (Natural Sciences)

Aerospace Studies—Air Force ROTC (AS)

Professor Quillin, Colonel, USAF, *Chair*; Visiting Assistant Professor Henry-Hamilton, Captain, USAF, *Director of Undergraduate Studies*; Visiting Assistant Professor Culver, Captain, USAF

Eligibility Requirements. All freshmen and sophomores, men or women, are eligible to enroll in the General Military Course in the Air Force Reserve Officer Training Corps. For enrollment in the Professional Officer Course, the student must have completed successfully either the General Military Course or the six-week field training course; must execute a written agreement with the government to complete the Professional Officer Course; must be sworn into the enlisted reserve; and must agree to accept a commission in the U.S. Air Force Reserve upon graduation. In addition, each student must take at least one course in mathematical reasoning prior to graduation/commissioning. Students in the General Military Course and Professional Officer Course also will be required to attend one hour of leadership laboratory each week. All courses, except 2L, are open to all other students with consent of instructor.

General Military Courses

First Year

1. The Air Force Today. Development of aerospace power in the United States; mission, doctrine, and organization of the U.S. Air Force and its relationship to the other services within the Department of Defense. (May not be counted to satisfy graduation requirements.) Half course. *Quillin*

2L. Leadership Laboratory. Instruction in drill and ceremonies, wearing the uniform, giving commands, and other leadership activities. Mandatory for all Air Force ROTC cadets. Must be repeated each semester. Pass/fail grading only. No credit. *Staff*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

Second Year

51. Development of Air Power. Growth and development of air power from dirigibles and balloons to the present, emphasizing evolution of concepts and doctrine governing air power employment in support of national objectives. (May not be counted to satisfy graduation requirements.) Half course. *Staff*

Professional Officer Courses

All students selected to continue aerospace studies pursue the following courses:

Third Year

105S. Aerospace Leadership and Management. An introduction to management fundamentals to include the knowledge base and process of managing. One course. *Staff*

106S. Aerospace Leadership and Management. Application of management fundamentals to duties as junior officers/executives to include principles of leadership. One course. *Staff*

Fourth Year

205S. National Security Forces in Contemporary American Society. The evolution of U.S. foreign policy and the environment in which national security policy is formulated. One course. *Culver*

206S. National Security Forces in Contemporary American Society. The role and function of the professional military officer in a democratic society, military law, and contemporary issues in the military. One course. *Culver*

African and Afro-American Studies Program (AAS)

Professor Wright, *Director*

A major or a certificate is available in this program.

The program in African and Afro-American Studies provides students with an interdisciplinary approach to the field, within which they may focus on Africa, North America, or the Caribbean. The courses are essential components of a liberal arts education. Students may complete a major or a certificate in the program. Nine courses (including a prerequisite course entitled Introduction to African and Afro-American Experiences) are required for the major; five are required for the certificate. A Duke summer study program is available in Zimbabwe/Botswana sponsored by the Department of Political Science.

The African and Afro-American Studies courses are listed below. (Full descriptions of cross-listed courses may be found in the Bulletin course listings of the particular department or program cited in the cross-listing, for example, Music 74.) In addition, Swahili and Arabic language courses are taught in the Asian and African Languages and Literature Program, and other relevant language courses in the Department of Romance Studies. A half-credit course in African dance technique is offered in the Dance Program.

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

51. Introduction to African and Afro-American Experiences. (CZ) A general interdisciplinary study providing a broad overview of: African origins and culture, the slave trade in both Africa and the Americas, the antebellum period in the Americas, the struggle for freedom by black people, and the post-1865 period. One course. *Staff*

74. Introduction to Jazz. (AL) See C-L: Music 74. One course. *Jeffrey*

100. Duke Summer Program: Zimbabwe/Botswana. (SS) See C-L: Political Science 100C; also C-L: Comparative Area Studies. Variable credit.

115. History of Africa. (CZ) See C-L: History 115; also C-L: Comparative Area Studies and Women's Studies. One course. *Ewald*

116. Race and Ethnic Relations. (SS) See C-L: Sociology 116. One course. *Jackson*

122. Modern Africa. (CZ) See C-L: Cultural Anthropology 122; also C-L: Comparative Area Studies. One course. *O'Barr*

124S. Slave Society in Colonial Anglo-America: The West Indies, South Carolina, and Virginia. (CZ) See C-L: History 124S; also C-L: Comparative Area Studies. One course. *Gaspar*

127. The Caribbean in the Eighteenth Century. (CZ) See C-L: History 127. One course. *Gaspar*

133. History of African-American Dance. (AL) See C-L: Dance 133. One course. *Staff*

138. Francophone Literature. (AL, FL) Prerequisite: good knowledge of French. See C-L: French 168; also C-L: Asian and African Languages and Literature 168 and Comparative Area Studies. One course. *Mudimbe-Boyi*

140S. Ascendancy of the Jazz Solo. (AL) Prerequisites: ability to read music, and Music 74 or consent of instructor. See C-L: Music 140S. One course. *Brothers*

141. Special Topics in Jazz. (AL) Also taught as Music 141. Prerequisite: Music 74 or consent of instructor. One course. *Brothers or Jeffrey*

145A, 145B. Afro-American History. (CZ) See C-L: History 145A, 145B. One course each. *Gavins*

149. Introduction to African-American Politics. (SS) See C-L: Political Science 141. One course. *Orr*

152. Cult, Sect, and Church in Black Religion in America. (CZ) See C-L: Religion 154. One course. *Lincoln*

153. From the African Kraal to the African-American Church. (CZ) See C-L: Religion 153. One course. *Lincoln*

154. Art and Philosophy from West Africa to the Black Americas. (AL) See C-L: Art 174; also C-L: Comparative Area Studies and Literature 125. One course. *Powell*

156. The Blues Aesthetic: Afro-American Art in the Twentieth Century. (AL) See C-L: Art 176; also C-L: Literature 127. One course. *Powell*

157. Art, Architecture, and Masquerade in Africa. (AL) See C-L: Art 173; also C-L: Comparative Area Studies. One course. *Powell*

161S. Economics of Slavery in the American South. (SS) Prerequisite: Economics 149. See C-L: Economics 161S; also C-L: History 140S. One course. *Coats*

164. History and Religions of North Africa. (CZ) See C-L: Religion 164; also C-L: Comparative Area Studies, History 187, and Interdisciplinary Course 164. One course. *Cornell or Lawrence*

168S. The Atlantic Slave Trade. (CZ) See C-L: History 168S; also C-L: Comparative Area Studies. One course. *Gaspar*

169S. Afro-American Drama. (AL) Also taught as English 169S. One course. *Hill*

170. Brazilian Race Relations in Comparative Perspective. (CZ) See C-L: History 170C. One course. *French*

171. Politics of South African Apartheid (B). (SS) See C-L: Political Science 171; also C-L: Comparative Area Studies. One course. *Johns*

173, 174. African American Literature. (AL) See C-L: English 167, 168. One course each. *Chandler or Holloway*

175S. The Southern Plantation as Historical Laboratory: Odyssey in Black and White, 1770-1970. (CZ) See C-L: History 175S. One course. *Nathans*

176S. The Southern Plantation as Historical Laboratory: Research Seminar. (CZ) See C-L: History 176S. One course. *Nathans*

179. History of South Africa, 1600-1960. (CZ) See C-L: History 179; also C-L: Comparative Area Studies. One course. *Ewald*

180. Writings in the Rural Tradition: From the Caribbean to the American South. (AL) See C-L: Literature 180; also C-L: Comparative Area Studies and English 180. One course. *Willis*

195S. Fugitive Slave (Maroon) Communities in New World Slave Societies. (CZ) Also taught as History 195S.40. C-L: Comparative Area Studies. One course. *Gaspar*

196S. Issues in the History of Tropical Africa. (SS) Also taught as History 195S.23. C-L: Comparative Area Studies. One course. *Ewald*

197S. The Destruction and Aftermath of Slavery in the Americas: A Comparative Perspective. (CZ) Also taught as History 195S.18. One course. *J. Scott*

198S. **Senior Seminar.** Open to seniors majoring in African and Afro-American Studies and to others with consent of instructor. One course. *Staff*

199S. **Special Topics.** Topics vary from semester to semester. One course. *Staff*

206. **Origins of Afro-America. (CZ)** See C-L: History 206. One course. *J. Scott*

233S. **Slave Resistance and Social Control in New World Societies. (CZ)** See C-L: History 233S; also C-L: Comparative Area Studies. One course. *Gaspar*

264S. **Poverty and Social Policy: Life Course Human Resource Development. (SS)** Also taught as Public Policy Studies 264S.46. One course. *Staff*

270S. **Topics in African Art. (AL)** Consent of instructor required. See C-L: Art 270S. One course. *Powell*

299. **Special Topics.** Topics vary from semester to semester. One course. *Staff*

299S. **Special Topics.** Seminar version of African and Afro-American Studies 299. One course. *Staff*

COURSES CURRENTLY UNSCHEDULED

103. **North African Culture. (AL)**

128. **Writings in the Pan-African Tradition. (AL)**

131S. **Comparative Government and Politics: Africa. (SS)**

155. **Comparative Perspectives on Literature and Social Change: From Plantation to City. (AL)**

261. **Islam in the African-American Experience. (CZ)**

THE MAJOR

Students may choose one of the two following options.

A. North American Focus

Prerequisite: African and Afro-American Studies 51.

Major Requirements:

1. Three courses—*One* focusing upon North America in *each* of the following areas:
 - a. Arts or Literature
 - b. History
 - c. Social, Religious, Economic, or Political Institutions/Processes.
2. African and Afro-American Studies 198S (Senior Seminar).
3. Four additional courses, preferably in, but not limited to, one of the areas noted in Item 1. One of these four courses must focus upon Africa or on the Caribbean/Latin America.

B. African/Caribbean Focus

Prerequisite: African and Afro-American Studies 51.

Corequisites: Four (4) semester courses, or equivalent competency, in a single foreign language appropriate to the primary focus (African or Caribbean): Arabic, French, Spanish, Portuguese, or Swahili.

Major Requirements:

1. Three courses—*One* focusing upon Africa or the Caribbean/Latin America in *each* of the following areas:
 - a. Arts or Literature

- b. History
 - c. Social, Religious, Economic, or Political Institutions/Processes.
2. African and Afro-American Studies 198S (Senior Seminar).
 3. Four additional courses, preferably in, but not limited to, one of the areas noted in Item 1. At least one of these four courses must focus upon Africa and at least one must focus upon Caribbean/Latin America.

THE CERTIFICATE

Students who are not majoring in African and Afro-American Studies may complete a certificate in the field by satisfactory completion of the following five courses:

1. African and Afro-American Studies 51.
 2. Four additional courses in the program—one in each of the following areas:
 - a. Arts or Literature
 - b. History
 - c. Social, Religious, Economic, or Political Institutions/Processes.
- N.B. One of these four courses must focus upon Africa or the Caribbean/Latin America.

Animal Behavior

For courses in animal behavior, see Biology.

Anthropology

See the Department of Biological Anthropology and Anatomy and the Department of Cultural Anthropology for information about those majors.

Arabic

For courses in Arabic, see Asian and African Languages and Literature.

Art and Art History (ART)

Associate Professor Wharton, *Chair*; Assistant Professor Stiles, *Director of Undergraduate Studies*; Professor Bruzelius; Associate Professors Powell and Pratt; Assistant Professors Cernuschi, Rice, and Van Miegroet; Professors Emeriti Markman, Spencer, and Sunderland; Associate Professor of the Practice Tronzo; Assistant Professors of the Practice Bregel, Noland, and Shatzman; Adjunct Professor Lee; Adjunct Assistant Professor Reents-Budet

Majors in art history and visual arts are available in this department.

HISTORY OF ART

Art history is the study of works of art in the context of the broader social, political, and intellectual cultures of which they are a part. Studying art history develops the ability to evaluate and organize information, visual as well as verbal; it also enhances the faculties of creative imagination, precise observation, clear expression, and critical judgment. Students of art history acquire a sophisticated understanding of the theory and practice of artistic production and reception.

A major or second major in art history provides basic training for those interested in art-historical or art teaching, museum and gallery work, art publishing, and advertising; the major also furnishes an appropriate background for graduate training in architecture. Art history's emphasis upon careful observation, the ordering of diverse

sorts of information, expository writing, and scholarly research makes it a good general preparation for any profession.

20. Basic Art History. Credit for advanced placement on the basis of the College Board examination in Art History. Does not count toward the major in art history or design. One course.

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

50. Introduction to Spanish Art. (AL, FL) The history of art in Spain from prehistoric times to Picasso and other artists of the twentieth century. (Taught in Spanish in Spain.) One course. *Staff*

51. Art of the Baroque and Rococo. (AL, FL) Study of one of the most important monuments of European Art, the Baroque through its most representative painters, and the introduction of a new art arising in France: the Rococo. The history of the movement in the country of each painter as well as the different characteristics in each particular case. (Taught in Spanish in Spain.) One course. *Staff*

55. History of Spanish Art of the Nineteenth Century: Goya and His Times. (AL, FL) Goya's life in its historical and artistic context; Goya as a painter of the aristocracy; his personal crisis; the Napoleonic invasion of 1808 and its influence on Goya; and his last stage. (Taught in Spanish in Spain.) One course. *Staff*

69, 70. Introduction to the History of Art. (AL) The history of western architecture, sculpture, and painting in a cultural context. 69: from prehistory to the Renaissance (c. 1400). 70: from the Renaissance to the present. One course each. *Staff*

100. Art and Architecture of Vienna. (AL) Famous periods of art and architecture particular to Vienna, with special emphasis on the Baroque. In-class slide presentations combined with field trips to the Vienna Museum of Art History, the Albertina, and architecturally noteworthy sites. Taught in English in the Duke in Vienna Program. One course. *Staff*

115. Ancient Greece. (CZ) Prerequisite: Classical Studies 11S, 53, 123, or 124, or History 53, or consent of instructor. See C-L: Classical Studies 147. One course. *Younger*

123. Greek Art and Archaeology I. (AL) See C-L: Classical Studies 123. One course. *Younger*

124. Greek Art and Archaeology II. (AL) See C-L: Classical Studies 124. One course. *Younger*

126. Rome: History of the City. (CZ) See C-L: Classical Studies 145. One course. *Staff*

128. Art of the Roman Empire. (AL) Art and architecture in the Roman world from Augustus to Theodosius. Emphasis on portraiture, private arts, and triumphal monuments. Not open to students who have had Classical Studies 126. C-L: Classical Studies 128. One course. *Staff*

129. The History of Prints and Printmaking. (AL) The art of printmaking from the fifteenth through the eighteenth centuries. The impact of the invention of printing; technical and artistic innovations; the contributions of individual artists from Mantegna to Tiepolo. Firsthand experience of basic printmaking techniques in the studio; study of original works of art on frequent trips to local museums and libraries. Consent of instructor required. C-L: Medieval and Renaissance Studies. One course. *Rice*

130. Late Antique Christian Art. (AL) Art and architecture of the Christian community from the third to the fifth century in the context of the Roman imperial state. C-L: Classical Studies 130 and Religion 130. One course. *Wharton*

131. Art of the Early Middle Ages. (AL) Survey of Early Christian, Byzantine, Carolingian, and Ottonian art and architecture. Focus on the impact of church and empire on the form and function of artworks from the third to eleventh centuries. C-L: Classical Studies 131 and Medieval and Renaissance Studies. One course. *Tronzo or Wharton*

134. Topics in Medieval Art and Architecture. (AL) Specific problems dealing with contextual and cultural issues in medieval art and architecture from c. 300 to 1400. C-L: Medieval and Renaissance Studies. One course. *Tronzo*

139. Aspects of Medieval Culture. (CZ) See C-L: Medieval and Renaissance Studies 114; also C-L: Classical Studies 139 and History 116. One course. *Rasmussen, Tronzo, and Witt*

140. Topics in Renaissance Art. (AL) Specific problems dealing with the iconography, style, or an individual master from c. 1300 to 1600. Subject varies from year to year. C-L: Medieval and Renaissance Studies. One course. *Rice or Tronzo*

141. Fifteenth-Century Italian Art. (AL) Painting, sculpture, and architecture from Masaccio, Donatello, and Brunelleschi to Leonardo. Emphasis on the art of Florence. C-L: Medieval and Renaissance Studies. One course. *Rice*

142. Sixteenth-Century Italian Art. (AL) Painting and sculpture in Rome and Florence: Michelangelo, Raphael, Leonardo. The rise and diffusion of mannerism: Pontormo to Tintoretto. C-L: Medieval and Renaissance Studies. One course. *Rice*

145. Renaissance Art in Florence. (AL) Paintings, sculpture, and architecture from Giotto to Michelangelo based on the works of art preserved in Florence. Emphasis on individual artists and their creations and on the relation of the artists to the society of their times. (Taught in Italy.) C-L: Medieval and Renaissance Studies. One course. *Rice*

146. Italian Renaissance Architecture. (AL) Development of building types and city planning in the fifteenth and sixteenth centuries in central and northern Italy. Emphasis on Brunelleschi, Alberti, Bramante, Michelangelo, and Palladio. C-L: Medieval and Renaissance Studies. One course. *Rice*

148. Art of the Netherlands in the Fifteenth Century. (AL) Early Netherlandish painting in the Burgundian Netherlands from Hubrecht and Jan Van Eyck to Gerard David and Hieronymus Bosch. Cultural, historical, and intellectual environment in Flanders and Brabant; civic and courtly patronage in Doornik (Tournai), Ghent, Bruges, Mechlin, and Antwerp; new research strategies of contemporary evidence. C-L: Medieval and Renaissance Studies. One course. *Van Miegroet*

149. Aspects of Renaissance Culture. (CZ) See C-L: Medieval and Renaissance Studies 115; also C-L: History 148. One course. *Rasmussen, Van Miegroet, and Witt*

150. Italian Baroque Architecture. (AL) Architecture in Italy in the seventeenth and eighteenth centuries. Emphasis on the contributions of Bernini, Borromini, Cortona, Guarini, and Juvarra. The evolution of building types, both secular and religious; town planning; garden and landscape history. Special attention to the cultural, economic, and political forces that shaped the Baroque city. C-L: Medieval and Renaissance Studies. One course. *Rice*

151. Art of Italy in the Seventeenth Century. (AL) Caravaggio, the Carracci, Guido Reni, Domenichino, Bernini, and Poussin. Modes of description and narration; the concern with the status of pictorial representation; and the attempts to define and retrieve the canonical achievements of the early sixteenth century. One course. *Rice*

152. Art of the Netherlands in the Sixteenth Century. (AL) Painting in Antwerp and the Spanish Netherlands in a period of political turbulence (Reformation, Counter-

Reformation); Pieter Bruegel, Frans Floris, Hendrick Goltzius; landscape painters and the exiles at Frankenthal; Flemish painters at the court of Rudolph II in Prague; art and politics in Flanders, Brabant, and Holland. C-L: Comparative Area Studies and Medieval and Renaissance Studies. One course. *Van Miegroet*

153. Art of the Northern Netherlands in the Seventeenth Century. (AL) A contextual study of northern Netherlands art, seen through the major Dutch cities and towns where painters, such as Frans Hals and Johannes Vermeer, were at work. Rembrandt and his school; Dutch art in its historical, societal, moral, and psychological context. C-L: Comparative Area Studies and Medieval and Renaissance Studies. One course. *Van Miegroet*

154. German Art in the Fifteenth and Sixteenth Centuries. (AL) An examination of German art, including Stefan Lochner, Konrad Witz, Albrecht Dürer, and Hans Holbein the Younger; the significance of the Councils of Konstanz and Basel; the revolutionary impact of the printing press. New trends in sculpture, including the relatively unknown wood carvings created in Nuremberg between 1475 and 1515. C-L: Comparative Area Studies, Interdisciplinary German Studies, and Medieval and Renaissance Studies. One course. *Van Miegroet*

155. Mercantile Culture and Art in the Netherlands. (CZ) The mercantile culture and its relationship with art and the occupation of artist in the Netherlands (fifteenth-seventeenth centuries, with main stress on seventeenth). The economy of towns, the artist's social position, the place of art in the local economy, and the connections between economic well being and the emergence of art as asset. Commercial evolution: institutions (markets, bans, stock exchanges), instruments (for example, the bill of exchange), and attendant conditions (risk, speculations, panics). The peculiarities of Dutch picturing, the role of art as moveable product, liquidity and store of value. Prerequisites: Art 70 and consent of instructor. C-L: Comparative Area Studies and Economics 152. One course. *De Marchi and Van Miegroet*

156. Art of the Southern Netherlands in the Seventeenth Century. (AL) The artistic preeminence of Antwerp in the southern Netherlands from Jan I Bruegel to Pieter Paul Rubens, Antoon Van Dyck, and Jacob Jordaens. New cultural, political, and artistic attitudes under the Spanish/ Austrian Habsburgs; atelier practices and connoisseurship problems; prints and drawings; creative methods of research. C-L: Comparative Area Studies and Medieval and Renaissance Studies. One course. *Van Miegroet*

158-159. Art and Cultural History of Flanders and the Netherlands from the Fifteenth through the Seventeenth Centuries. (AL) A contextual interpretation of art and culture of the Greater Netherlands through intensive and immediate contact with the cultural legacy of major cities such as Ghent, Bruges, Leuven, Antwerp, and Brussels in the south, and Haarlem, Leiden, Amsterdam, Delft, and Utrecht in the north. Visits to major museums, cathedrals, the atelier of Rubens; discussion of major painters such as Van Eyck, Bosch, Bruegel, Rembrandt, Hals, Vermeer, Jordeans, and Rubens. (Taught in Flanders and the Netherlands.) C-L: Comparative Area Studies. Two courses. *Van Miegroet*

161. Nineteenth-Century Art, 1789-1848: Revolution to Revolution. (AL) Painting and sculpture of leading artists within the movements of neoclassicism, romanticism, and mid-century realism. C-L: Comparative Area Studies. One course. *Cernuschi*

162. American Art from Colonial Times to 1900. (AL) The development of an American national school in portraiture, history painting, landscape, genre scenes, and still-life. Major figures include Copley, Bingham, Cole, Church, Whistler, and Eakins. One course. *Powell*

163. Twentieth-Century American Art: Identity and Nationalism. (AL) Survey of twentieth-century American art from 1900 to the present, including major stylistic and theoretical developments and movements (that is, the Harlem Renaissance, the "American Scene," and others). Special attention to artistic activities emanating from such government-sponsored programs as the Works Progress Administration's Federal Art Projects, the Farm Security Administration's Photography Units, and the National Endowment for the Arts' various programs. C-L: Literature 163. One course. *Powell*

166. Nineteenth-Century Art after 1848: Early Modernism. (AL) A survey of the second half of the nineteenth century in Europe with particular emphasis on realism, impressionism, post-impressionism, and symbolism. One course. *Cernuschi or Stiles*

167. Twentieth-Century Art, 1900-1945: The Avant-garde and Modernism. (AL) Major artistic movements and theoretical aims of early modernism: fauvism, cubism, expressionism, futurism, constructivism, suprematism, dada, surrealism, deStijl, Bauhaus, and Neue Sachlichkeit. C-L: Comparative Area Studies, Literature 167, and Women's Studies. One course. *Cernuschi or Stiles*

168. Art since 1945: Modernism and Postmodernism. (AL) Major artistic movements and theory in Europe and the United States after World War II: abstract expressionism, color field, pop art, minimal art, Arte Povera, process, conceptual, and performance art, earthworks, photo-realism, neo-expressionism, and appropriation. C-L: Comparative Area Studies, Literature 168, and Women's Studies. One course. *Cernuschi or Stiles*

169. Documentary Photography and Social Activism in the Nuclear Age. (AL) The role of photojournalism and documentary photographers in recording and communicating vital issues of the nuclear age including nuclear weapons testing and its effects, the environmental issues surrounding fallout and nuclear power-plant accidents, low-level waste disposal, and other human and environmental issues related to war, the technology of nuclear weapon and energy production and their cultural manifestations. Not open to students who have taken Art 177B. C-L: Comparative Area Studies and Literature 172. One course. *Stiles*

172. Topics in Oriental Art. (AL) A critical survey of Chinese, Korean, and Japanese art from the earliest times to the nineteenth century. C-L: Comparative Area Studies. One course. *Lee*

173. Art, Architecture, and Masquerade in Africa. (AL) Major art forms, monuments, vernacular structures, and masking traditions in West, Central, and Southern Africa. From ancient times to the present. C-L: African and Afro-American Studies 157 and Comparative Area Studies. One course. *Powell*

174. Art and Philosophy from West Africa to the Black Americas. (AL) A survey of several major cultural groups in West Africa and their impact on the arts and religions of blacks in South America, the Caribbean, and the United States. C-L: African and Afro-American Studies 154, Comparative Area Studies, and Literature 125. One course. *Powell*

175. Art and Material Culture of the Southern United States. (AL) A survey of art that was created in the southern United States and made by artists from the South. Special attention given to material culture, vernacular art forms, site-specific creations, and work that addresses the idea of a regional identity. C-L: Literature 126. One course. *Powell*

176. The Blues Aesthetic: Afro-American Art in the Twentieth Century. (AL) Art of the twentieth century, with an emphasis on works derived from an Afro-United States cultural perspective. Major figures include Aaron Douglas, Jacob Lawrence, Charles

White, Elizabeth Catlett, and Romare Bearden. C-L: African and Afro-American Studies 156 and Literature 127. One course. *Powell*

177. The History of Conceptual Art. (AL) Works in the visual arts in which the primary means and medium of expression is language and systems: symbolic, natural, social, cultural, and political structures and institutions. Theoretical discussion focusing on the dematerialized art object and on the materialized art idea. Not open to students who have taken Art 177A. C-L: Comparative Area Studies and Literature 171. One course. *Stiles*

179. The History of Performance Art. (AL) Works in the visual arts in which the primary means and medium of expression is the human body in happenings, Fluxus, demonstrations, destruction art, body art, and performance since 1955. Theoretical discussion focusing on the challenge that live art poses to the traditional paradigm of the art object. C-L: Comparative Area Studies, Literature 176, and Women's Studies. One course. *Stiles*

180. The Interpretation of Abstraction. (AL) Different manifestations and philosophies of abstract art from their early philosophical roots in the late nineteenth century (Pater, Schopenhauer, Nietzsche) to twentieth-century formulations of modernism (Shapiro, Greenberg). Emphasis on the work of Picasso, Kandinsky, Malevich, Mondrian, Pollock, Rothko, Newman, Stella, Reinhardt, and Morris. One course. *Cernuschi*

181. The New York School: Art of the 1940s and 1950s. (AL) American art after World War II: abstract expressionism and the New York School. Emphasis on gestural painting (Pollock, de Kooning, Kline) and color field (Rothko, Newman, Gottlieb) with particular attention to issues of criticism and interpretation. One course. *Cernuschi*

182. The Concept of Expressionism. (AL) Expressionism in modern art with emphasis on early twentieth-century examples in Scandinavia, Austria, and Germany, abstract expressionism in New York, and recent manifestations of neo-expressionism associated with the postmodern. Emphasis on Munch, Schiele, Kirchner, Nolde, Pollock, de Kooning, Schnabel, Rainer, Baselitz, and Kiefer. One course. *Cernuschi*

184. History of Impressionism. (AL) The evolution of the impressionist movement and post-impressionist reactions of the 1880s. Particular attention to the work of Manet, Degas, Monet, Renoir, and Pissarro. C-L: Comparative Area Studies. One course. *Cernuschi*

186. Feminism in Twentieth-Century Art. (AL) A study of the contributions of women artists to the formal and theoretical discourses of modern art with particular attention to issues of feminism. C-L: Literature 149 and Women's Studies. One course. *Stiles*

187. Surrealism. (AL) The origins, aims, literature, and politics of the international movement of surrealism, which flourished between the world wars, examined in the context of surrealist theory. The psychoanalytic and metaphysical sources of surrealist poetry and visual representations as reflecting a utopian ideology of liberation. C-L: Comparative Area Studies and Women's Studies. One course. *Stiles*

188. Twentieth-Century Modernist and Postmodernist Criticism. (AL) A survey of the writings of artists, critics, and art historians from the late nineteenth century to the present, concentrating on major critical debates and on the interplay of various methodologies including formalist, iconographic, Marxist, feminist, psychoanalytic, structuralist, and poststructuralist in the interpretation of twentieth-century art. C-L: Literature 188. One course. *Cernuschi or Stiles*

189. Modern and Postmodern Architecture. (AL) The history of architecture from nineteenth-century Beaux-Arts classicism through Art Nouveau and the modern move-

ment to postmodernism. Political and ideological as well as the formal and technical aspects of building investigated through primary texts. C-L: Literature 189. One course. *Wharton*

191, 192. Independent Study. Directed reading and research. Open only to qualified students in the junior year, by consent of director of undergraduate studies. One course each. *Staff*

193. Art and Culture of Mesoamerica. (AL) The art of pre-Columbian Mesoamerica (Mexico, Guatemala, Belize, and Honduras) from the beginnings of permanent settlements through the coming of the Spaniards (2000 B.C.-1519 A.D.). The Olmec, Teotihuacan, Zapotec, Maya, Mixtec, and Aztec cultures, including the numerous indigenous writing systems, studied in order to understand sociopolitical and religious institutions. C-L: Comparative Area Studies. One course. *Reents-Budet*

194. Maya Art and Culture. (AL) The ancient Maya civilization of Mexico, Guatemala, and Belize explored through study of their material culture. Mayan religious and political iconography in conjunction with Mayan hieroglyphic writing. Approaches include those of archaeology, ethnohistory, and linguistics. C-L: Comparative Area Studies. One course. *Reents-Budet*

195. Pre-Columbian Art and Culture of Andean South America. (AL) The art of Peru, Bolivia, Ecuador, and Colombia from the beginnings of permanent settlements through the coming of the Spaniards (1534 A.D.), concentrating on sociopolitical and religious institutions. C-L: Comparative Area Studies. One course. *Reents-Budet*

For Seniors and Graduates

201S. Topics in Greek Art. (AL) Specific aspects of the art or architecture in the Greek world from the late Geometric to the Hellenistic periods. Subject varies from year to year. Consent of instructor required. C-L: Classical Studies 220S. One course. *Staff*

202S. Topics in Roman Art. (AL) Selected topics in the art and architecture of late republican and imperial Rome. Subject varies from year to year. Consent of instructor required. C-L: Classical Studies 227S. One course. *Staff*

216. The Art of the Counter Reformation. (AL) Religious art in Catholic Europe during and following the Council of Trent. Issues such as the rise of the new religious orders; the revival of interest in the early Church and the origins of Christian archaeology; the Church's use of art in its war against Protestantism. Considers the validity of the concept of a counter-reformation style. C-L: Medieval and Renaissance Studies. One course. *Rice*

233S. Topics in Early Christian and Byzantine Art. (AL) Specific conceptual, institutional, or formal problems in the art of the late antique world or of the east Roman Empire. Subject varies from year to year. Consent of instructor required. C-L: Classical Studies 230S, Medieval and Renaissance Studies, and Religion 275S. One course. *Wharton*

236S. Topics in Romanesque and Gothic Art and Architecture. (AL) Analysis of an individual topic. Subject varies from year to year. Consent of instructor required. C-L: Medieval and Renaissance Studies. One course. *Staff*

237S. Greek Painting. (AL) See C-L: Classical Studies 232S. One course. *Stanley*

238S. Greek Sculpture. (AL) See C-L: Classical Studies 231S. One course. *Younger*

243S. Topics in Netherlandish and German Art. (AL) Specific problems in northern Renaissance or baroque art such as the Antwerp workshops of the sixteenth century or a critical introduction to major artists such as Van Eyck, Bosch, Dürer, and Rubens. An

analytical approach to their lives, methods, atelier procedures and followers; drawings and connoisseurship problems; cultural, literary, social, and economic context; documentary and scientific research strategies. Subject varies from year to year. Consent of instructor required. C-L: Comparative Area Studies and Medieval and Renaissance Studies. One course. *Van Miegroet*

244A, S. International Expressionism. (AL) A synchronic view of the expressionist revolution in modern aesthetic conceptions throughout Europe in the period 1905-1925, emphasizing fusions of established aesthetic modes with new technological media, and the opening up of the Western tradition to other cultures, especially African. German expressionism forms the nucleus of the course and its study is integrated with the theory and practice of Italian futurism, Anglo-American imagism and vorticism, French surrealism, and Russian rayonnism. Not open to students who have taken Art 244S or German 244S. C-L: German 244A. One course. *Cernuschi and Rolleston*

244B, S. International Modernism. (AL) An interdisciplinary view of the various aesthetic and literary manifestations of European modernism: cubism, imagism, futurism, vorticism, suprematism, constructivism, dadaism, expressionism, and surrealism. C-L: German 244B. One course. *Cernuschi and Rolleston*

247S. Topics in Italian Renaissance Art. (AL) Specific problems dealing with iconography, style, or an individual master from c. 1300 to 1600. Subject varies from year to year. Consent of instructor required. C-L: Medieval and Renaissance Studies. One course. *Rice*

257S. Topics in Pre-Columbian Art and Culture. (AL) Selected topics in pre-Columbian art and archaeology with an emphasis on the political and cultural context of the artifact. Subject varies from year to year. Consent of instructor required. C-L: Comparative Area Studies. One course. *Reents-Budet*

260S. Topics in Italian Baroque Art. (AL) Problems in Italian art and architecture from c. 1580 to c. 1750. Topics vary from year to year. Consent of instructor required. C-L: Medieval and Renaissance Studies. One course. *Rice*

265S. Topics in Nineteenth-Century Art. (AL) Focus on a major artist, movement, or trend in nineteenth-century art. Subject varies from year to year. Consent of instructor required. One course. *Cernuschi or Stiles*

270S. Topics in African Art. (AL) Specific problems of iconography, style, or a particular art tradition. Subject varies from year to year. Consent of instructor required. C-L: African and Afro-American Studies 270S. One course. *Powell*

271S. Topics in Art of the United States. (AL) Selected topics from colonial times to 1945, with emphasis on major cultural issues, movements, works, and/or artists. Consent of instructor required. One course. *Powell or Stiles*

283S. Topics in Modern Art. (AL) Selected themes in modern art before 1945, with emphasis on major movements or masters. Subject varies from year to year. Consent of instructor required. C-L: Comparative Area Studies. One course. *Cernuschi or Stiles*

291, 292. Independent Study/Special Problems in Art History. Directed reading and research. Consent of instructor required. One course each. *Staff*

296S. Methodology of Art History. (AL) Approaches to the study and theory of art: historiography, connoisseurship, iconology, and criticism. Consent of instructor required. One course. *Staff*

297S. Topics in Art since 1945. (AL) Historical and critical principles applied to present-day artists and/or movements in all media since World War II. Consent of instructor required. C-L: Comparative Area Studies. One course. *Cernuschi or Stiles*

298S. Topics in Modern and Postmodern Architecture. (AL) The study of particular architects, movements, or building genres in their conceptual and political contexts. Subject varies from year to year. Consent of instructor required. C-L: Comparative Area Studies. One course. *Wharton*

299S. Critical Theory. (AL) Understanding of the visual arts in terms of the theoretical developments in other disciplines (for example, literature, women's studies, Marxism, and anthropology). Focus on the writings of theory-centered art historians and critics. Consent of instructor required. One course. *Cernuschi, Stiles, or Wharton*

VISUAL ARTS

Studio art courses offer directed experiences in the practice of the visual arts, enhancing the understanding of art both within the history of culture and as an individual human achievement. Department offerings emphasize the analysis and articulation of visual concepts and processes as they relate to a broader education in the humanities and sciences.

A major or concentration in studio art can provide the foundation for further study in various areas of the visual arts. It may prepare the student for further training as an artist, teacher, or architect, as well as in related fields such as advertising or design. Lower-level courses emphasize the fundamentals of drawing, color, and form; upper-level courses encourage the student to develop a more individual conceptual approach and style, within the context of historical precedents and traditions.

21. General Art, Studio. (AL) Credit for advanced placement on the basis of the College Board examination in Studio Art. Does not count toward the major in design. One course.

53. Drawing. (AL) Directed approaches to practice in life drawing and in the expression of graphic concepts. Consent of instructor required. One course. *Staff*

54. Two-Dimensional Design and Color. (AL) Experiments in form and color, with work from observation. Introduction to color theory in various media. Prerequisite: Art 53. One course. *Bregel or Pratt*

56. Sculpture. (AL) Introduction to the principles and processes of sculpture. Consent of instructor required. One course. *Noland*

101. Book Illustration. (AL) Each student will design and illustrate a story, journal, or grouping of poems. Projects will develop from initial sketches, to maquettes, and finally to the form of a bound book. Prerequisites: Art 53 and consent of instructor. One course. *Shatzman*

102. Figure Drawing. (AL) The human figure through different artistic media and visual concepts. Prerequisites: Art 53 and 54, and consent of the instructor based on portfolio. One course. *Staff*

103, 104. Painting. (AL) Studio practice in painting with individual and group criticism and discussion of important historic or contemporary ideas. Prerequisites: Art 54 or equivalent and consent of instructor. One course each. *Pratt*

105, 106. Advanced Drawing and Color. (AL) Work from life or in formal modes, with emphasis on personal development, through individual and group criticism and discussion. Prerequisites: Art 53 and 54 and consent of instructor. One course each. *Pratt*

107. Printmaking: Silkscreen. (AL) Studio course on the silkscreen medium and its stencil-making process including paper, film, blockouts, crayon, and photographic methods. Prerequisites: Art 53, 54 and consent of instructor. One course. *Shatzman*

108. Printmaking: Lithography. (AL) Introductory course on stone lithography and its drawing and printing techniques. Includes both black and white and color printing. Prerequisites: Art 53, 54 and consent of instructor. One course. *Shatzman*

109. Printmaking: Relief and Monotype. (AL) Studio course focusing on the relief methods of woodcut and linoleum block printing and monotype techniques. Concentration on the technical and historical aspects of the media at hand as well as visual and conceptual concerns. Prerequisites: Art 53, 54 and consent of instructor. One course. *Shatzman*

110. Intermediate Sculpture. (AL) Studio practice in sculpture at the intermediate level. Group and individual discussion and critique. Prerequisite: Art 56 or consent of instructor. One course. *Noland*

111. Advanced Sculpture. (AL) Studio practice in sculpture at the advanced level. Group and individual discussion and critique. Not open to students who have taken Art 111A. Prerequisites: Art 56 and 110, or consent of instructor. One course. *Noland*

112. Ceramics. (AL) Studio practice in the fundamentals of ceramics. Incorporates handbuilding techniques and sculpture in clay with emphasis on figurative and architectural forms. Wheel and throwing techniques. Group and individual criticism. Experimentation with range of surfaces and glazes. Study of both historical and contemporary ceramics. Consent of instructor required. One course. *Staff*

113. Printmaking: Intaglio. (AL) Studio course on directed problems in the intaglio medium including etching, aquatint, drypoint, black and white and color printing methods. Prerequisites: Art 53, 54 and consent of instructor. One course. *Shatzman*

118S. American Communities: A Photographic Approach. (SS) Consent of instructor required. See C-L: Public Policy Studies 176S; also C-L: Film and Video. One course. *Harris or Sartor*

119S. Advanced Documentary Photography. (SS) Prerequisite: Art 118S, Public Policy Studies 176S, or consent of instructor. See C-L: Public Policy Studies 177S. One course. *Harris*

120. Public Art and Private Concerns. (AL) Investigation of historical and contemporary examples of public art, its definitions, purposes, and precedents. Public art seen against artistic intention and public reaction. Field trips to area installations; visits by artists and administrators in the field. Not open to students who have taken Art 111B. One course. *Pratt*

165. Photography. (AL) The history of photography from its origins in the mid-nineteenth century, through the innovations in the 1930s that brought into use smaller, faster, and more discrete cameras, to the instant and ubiquitous presence it currently enjoys. Theoretical and historical readings complemented by the taking and processing of photographs. An exhibition of class work to be held at the end of the semester. Prerequisite: access to camera. C-L: Film and Video. One course. *Noland*

180S. Theory of Design. (AL) Visual thinking and innovations in historical and contemporary art. Formal analysis and discussion of important issues for students involved in creating art. Prerequisites: two courses in design and consent of instructor. One course. *Pratt*

203, 204. Advanced Painting. (AL) Prerequisites: Art 103, 104 and consent of instructor. One course each. *Pratt*

207, 208. Advanced Projects in Printmaking. (AL) Opportunity to work in the area(s) of choice. Emphasis on the visual and conceptual development through experi-

mentation and practice in printmaking. Prerequisites: Art 53, 54, 107, 108, and consent of instructor. One course each. *Shatzman*

217, 218. Individual Project. (AL) Independent work open to highly qualified juniors and seniors on recommendation of instructor and invitation of department. One course each. *Staff*

See also Institute of the Arts in this bulletin.

COURSES CURRENTLY UNSCHEDULED

114. The Aegean Bronze Age. (CZ)

116S. Athens. (CZ)

117. Pompeii. (CZ)

132. Art of the Late Middle Ages. (AL)

137-138. Roman and Non-Roman in Ancient Italy. (CZ)

143. Classical Tradition in the Renaissance. (CZ)

178. Pre-Columbian Art and Architecture. (AL)

205S. Greek Architecture. (AL)

206S. Roman Architecture. (AL)

227S. Roman Painting. (AL)

THE MAJOR

The student will elect a sequence of courses emphasizing either the history of art or visual art. The department offers work leading to graduation with distinction. See the section on honors in this bulletin.

History of Art

Major Requirements. The major in art history requires at least eight courses. Both Art 69 and 70 are required. The other six courses should be distributed across the fields of ancient, medieval, Renaissance/baroque, modern, and non-Western (pre-Columbian, African, Oriental). Students must, in any case, take at least one course in four of these five areas. No fewer than one of these eight courses must also be a 200-level seminar. Two years of college-level study or the equivalent in French, German, or Italian are strongly recommended. Majors contemplating graduate work in history of art are advised to take more than eight courses in history of art and to gain competence in French and German. It is suggested that students who are interested in preparing for graduate work in architecture supplement their major requirements in the history of art and architecture with the following courses: Mathematics 31, 32 and either Mathematics 103 or Physics 51L, 52L; Art 53 and either Art 54 or 56; Institute of the Arts/Biology 45S; Engineering 75L or 83L.

Visual Arts

Corequisites. Art 69 or 70 and one other art history course.

Major Requirements. Art 53, 54, and five additional upper-level courses, one of which must be in each of three primary areas: painting, printmaking, and sculpture. Visual arts majors are strongly encouraged to take an independent study and to arrange a solo or group campus exhibition of the resulting work during their senior year.

DOUBLE MAJOR IN ART HISTORY AND VISUAL ARTS

Major Requirements. Students who wish to have a double major in art history and visual arts must take a total of thirteen courses in the department, as follows. In art history, the student must take Art 69 or 70, and five courses at the 100-level or above, including at least one 200-level seminar. These five courses must be distributed over four of the following five areas: Ancient, Medieval, Renaissance/Baroque, Modern, and Non-Western. In visual arts, the student must take Art 53 and 54 or 56 as well as at least five courses at the 100-level.

Institute of the Arts (AI)

A certificate, but not a major, is available in this program.

The Institute of the Arts administers an undergraduate certificate program in the arts, provides advisors for interdepartmental concentrations in the arts and assists students in designing individualized courses of study, offers interdisciplinary courses, sponsors artist residencies, coordinates and promotes activities in the creative and performing arts, and works to expand the role of the artist in a liberal arts setting. Courses, festivals, and events sponsored by the institute bring together faculty and students in different art forms to encourage an interdisciplinary perspective. A fall-semester off-campus residency program, the Duke in New York Arts Program, provides academic and professional experiences for selected juniors and seniors. For further information about the institute, inquire in 109 Bivins Building.

DUKE IN NEW YORK ARTS PROGRAM

The institute-sponsored Duke in New York Arts Program offers an intensive, off-campus experience for a select group of juniors and seniors. The program has four components, each earning one credit: two seminars, an arts internship, and a course at New York University. The Duke courses are described below under institute courses. For information on admission to this program, contact the Institute of the Arts.

INSTITUTE OF THE ARTS (AI)

20S. Structure. Does not count toward the areas of knowledge requirements. See C-L: Biology 45S. One course. *Wainwright*

101S. Arts Resources in New York. (AL) Investigation of a central theme through attendance at selected art events in the New York area supplemented by discussions, critical papers, and reports. Visiting Duke faculty members and New York practitioners in the arts provide guest lectures and lead discussions. Open only to those admitted to the Duke in New York Arts Program. One course. *Staff*

102. Arts Internship in New York. Immersion in the professional art world through apprenticeship to a sponsoring artist, scholar, or organization chosen to match each student's area of interest and expertise. Offered only on the pass/fail basis and open only to students admitted to the Duke in New York Arts Program. One course. *Staff*

103S. Arts Production, Promotion, and Presentation in New York. Analysis and investigation of the processes by which representative arts events and endeavors in New York are conceived, developed, produced, promoted, performed, and evaluated. Guest lectures by practitioners in these processes. Open only to students admitted to the Duke in New York Arts Program. One course. *Staff*

115S. Film and Video Theory and Practice. (AL) Prerequisite: Drama 132, English 101A, or Literature 177. See C-L: English 183S; also C-L: Drama 131S and Film and Video. One course. *Staff*

121S. The Diaghilev Ballet, 1909-1929. (AL) Prerequisite: junior or senior standing or consent of instructor. See C-L: Dance 188S; also C-L: Interdisciplinary Course 188S. One course. *Dickinson and staff*

122. The Arts in Contemporary Culture. (AL) The arts as a form of cultural practice, locating them in their sociopolitical context. The relationship between aesthetic history and cultural history. Questions about spectatorship, gender, race, and social class as they relate to the production, performance, perception, and criticism of the arts. Attendance at performances, exhibitions, and presentations. One course. *Staff*

150. Managing the Arts. Various aspects of planning, organization, promotion, resource development, and general operations of such typical arts organizations as arts councils, museums and galleries, subscription series, orchestras, and dance and theatre companies. Private, public, and governmental support for the arts. Not open to freshmen. One course. *Silbiger*

151S. Art and Its Making. (AL) An inquiry into artistic process from a conceptual survey of dominant views to direct interviewing of and discussion with artists. Not open to freshmen. One course. *Staff*

180, 181. Special Topics. (AL) Subjects associated with visiting Artists-in-Residence in the institute. Discussions and lectures conducted by guest artists on aspects of their work, views of the arts, associations with other disciplines. Previous topics have included "George Balanchine and Contemporary Ballet" and "Aspects of Broadway Bound." Topics announced each semester. Half course, one course, respectively. Variable credit. *Staff*

191, 192 Independent Study. Directed reading and research. Consent of instructor required. One course each. *Staff*

COURSES CURRENTLY UNSCHEDULED

110S. Video and Performance. (AL)

123. Music Theater Practicum

130. Inter-Arts: Theory and Practice. (AL)

ARTIST-IN-RESIDENCE PROGRAM

The Nancy Hanks Artist Residency Program brings distinguished artists to Duke to interact with students, faculty, and the community at large, in settings as diverse as formal courses, class visits, performances and exhibitions, informal workshops and seminars, and off-campus programs. Courses by Nancy Hanks Resident Artists and by other visiting artists in the institute may not be listed in the bulletin since they vary from year to year. Consult the current course schedule and the institute for information about courses by artists in residence.

Asian and African Languages and Literature (AAL)

Associate Professor Wang, *Director*; Associate Professor of the Practice Khanna, *Director of Undergraduate Studies*; Professor Cooke; Assistant Professor Dodd; Assistant Professors of the Practice Endo and Yao; Lecturers Cornell and Zakim; Instructor Park Han. Affiliated faculty: Professors Mudimbe-Boyi (Romance studies), Lawrence (religion), and O'Barr (cultural anthropology)

A certificate, but not a major, is available in this program.

Asian and African Languages and Literature provides instruction in several languages and literatures of Asia and Africa. Languages offered are Arabic, Chinese,

Hebrew, Hindi, Japanese, Korean, Persian, and Swahili. The program offers Arabic, Chinese, Hebrew, Hindi, and Japanese literature courses, many in translation. Its courses are particularly compatible with a major in Comparative Area Studies and the Literature Program.

To earn the certificate in Asian and African Languages and Literature students must take two years of introductory and intermediate language instruction and five other courses, consisting of the core course, Asian and African Languages and Literature 121 (Introduction to Asian and African Literature); two language courses at the third-year level (125, 126); a 100-level related literature or culture course; and one course in a related Asian or African language or literature. During the spring semester an Asian and African film festival is held.

ASIAN AND AFRICAN LANGUAGES AND LITERATURE (AAL)

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

72. War, Gender, and Postcoloniality. (AL) Covers selected wars in the twentieth century by examining the intersections between the experience of war and the ways in which men and women represent themselves. Focus on World Wars I and II, Vietnam, the Algerian Revolution, the Lebanese Civil War, and the Gulf War. One course. *Cooke*

121. Introduction to Asian and African Literature. (AL) An exploration of the ways in which different societies in Asia and Africa encourage particular constructions of self, sexuality, and purposeful life in literature and film. C-L: Comparative Area Studies and Literature 121. One course. *Staff*

137. Contemporary Culture in South Asia. (CZ) Everyday life in Indian cities and villages as represented in popular and intellectual media. Perspectives on cinema, television, and radio along with more traditional media. The fiction of Mohan Rakesh, the poetry of Muktibodh, the cinema of Aravindan and Satyajit Ray, the great Indian epics on Indian television. Taught in English. C-L: Comparative Area Studies and Literature 137. One course. *Khanna*

138. The Media in Modern India. (CZ) The influence of modern media on Indian society. Topics include: traditional sources of new knowledge; the role of print media during colonization and in the postcolonial period; the emergence of radio; contemporary use of film and television. (Taught in summer program in Bombay.) One course. *Khanna*

160, 161. Introduction to the Civilizations of Southern Asia. (CZ) See C-L: Interdisciplinary Course 101, 102; also C-L: Comparative Area Studies; Cultural Anthropology 101, 102; History 193, 194; and Religion 160, 161. One course each. *Khanna or staff*

166S. Chinese Thought from Confucius to Mao. (CZ) Introductory survey of the major Chinese thinkers throughout history. Emphasis on the classical period including the comparison with the themes and schools of Western and other non-Western philosophies (especially Indian). Detailed projects on individual thinkers. C-L: Comparative Area Studies. One course. *Mair*

168. Francophone Literature. (AL, FL) Prerequisite: good knowledge of French. See C-L: French 168; also C-L: African and Afro-American Studies 138 and Comparative Area Studies. One course. *Mudimbe-Boyi*

172S. South Asia in Poetry. (AL) Poetry from the Rig-Veda to contemporary times used as a mirror of, and approach to, religion, culture, and history of the region. Including Hindu traditional and mystical, Muslim medieval, early modern. No prior knowledge of foreign languages or South Asian culture required. One course. *Basu*

173S. Women in Arab Literature. (AL) Comparative readings of major Arabophone and Francophone women's writings from the nineteenth century until today, including al-Saadawi, al-Shaikh, Andree Chedid, and Djébar. Taught in English. C-L: Literature 142S and Women's Studies. One course. *Cooke*

177. South Asian Women's Literature. (AL) Survey of how women's writing in South Asia, although in many ways systematically marginalized or excluded, was nonetheless of considerable structural significance to the various literary traditions, and how this writing reflects the changing socio-cultural contexts in which women lived. C-L: Women's Studies. One course. *Basu*

181. Chinese Poetry and Prose in Translation. (AL) A chronological survey from earliest times to the end of the last century. Begins with a brief introduction to Chinese language and history insofar as they pertain to the study of literature. Essays, letters, classics, and various genres of poetry. Traditional Chinese literary criticism and bibliographical schemes. No knowledge of Chinese language required, although a number of poems will be examined in transcription with word-for-word translations. One course. *Mair*

197S. Studies in Asian and African Literature. Topics vary each semester. One course. *Staff*

199. Asian and African Languages and Literature Honors Seminar. Open to seniors completing the certificate in Asian and African Languages and Literature (Arabic, Chinese, Hebrew, Hindi, Japanese, Korean, Persian, Swahili). Consent of instructor required. One course. *Staff*

252. Special Topics in Asian and African Literatures. (AL) Topics vary each semester. One course. *Staff*

Courses Currently Unscheduled

107. Comparative Orthography. (CZ)

131. Introduction to Asian and African Linguistics. (SS)

171. Women and Creativity. (AL)

175. Creativity, Self, and Other Cross-Cultural Perspectives. (AL)

205S. Gender and War. (CZ)

207S. Against Textual Hegemony: Voicing Theory from the Margins. (AL)

ARABIC (ARB)

1, 2. Elementary Arabic. (FL) Understanding, speaking, reading, and writing modern standard Arabic. Language laboratory. One course each. *Cooke or Cornell*

63, 64. Intermediate Arabic. (FL) Reading, composition, and conversation in modern standard Arabic. Readings include selections from the Qur'an, contemporary literature, and the Arabic press. One course each. *Cooke or Cornell*

125, 126. Advanced Arabic. (AL, FL) Readings in classical and contemporary fiction and nonfiction. Works include al-Jahiz, Ibn Arabi, Taha Husain, Ibn Battuta, Ghada al-Samman and *1001 Nights*. Prerequisite: Arabic 64 or equivalent. C-L: Comparative Area Studies. One course each. *Cooke or Cornell*

137. Qur'anic Studies. (FL) Introduction to the reading, recitation, grammatical study, and exegesis of selected Qur'anic texts. Prerequisite: Arabic 63, 64 or consent of instructor. One course. *Cornell*

183, 184. Topics in Arabic. (AL, FL) Readings and other material, including films, television, and radio broadcasts. Exercises in composition. Prerequisite: Arabic 126 or consent of instructor. C-L: Comparative Area Studies. One course each. *Cornell*

191, 192. Independent Study. One course each. *Cooke or Cornell*

Courses Currently Unscheduled

100. North African Culture. (AL)

161. Natural Space and Social Life in Morocco. (CZ)

CHINESE (CHN)

1, 2. Elementary Chinese. (FL) Introduction to speaking, understanding, reading, and writing modern standard Chinese (Mandarin, or *putonghua*, based on the Beijing dialect). One course each. *Wang and staff*

1A. Abridged Elementary Chinese. (FL) Fundamentals of spoken and written modern standard Chinese (Mandarin). Intended for post-baccalaureate and summer session students. Consent of instructor required. One course. *Staff*

2A. Abridged Elementary Chinese II. (FL) Prerequisites: Chinese 1A and consent of instructor. One course. *Staff*

3. Literacy in Chinese. (FL) An alternative to Chinese 1, 2 for fluent speakers of modern standard Chinese (Mandarin), with little or no reading and writing ability, who wish to make sufficient progress in one semester to advance to Chinese 64 in the spring semester. One course. *Yao*

4, 5. Elementary Chinese Conversation. (FL) Introduction to spoken Mandarin Chinese with emphasis on basic conversational style. This course supplements Chinese 1, 2 (Elementary Chinese). Students taking Chinese 1, 2 are required to take this course. Half course each. *Staff*

63, 64. Intermediate Chinese. (FL) Reading, oral practice, language laboratory. One and one-half courses each. *Yao*

125, 126. Advanced Chinese. (CZ, FL) Proficiency in speaking, aural comprehension, reading, and writing. Content drawn from newspaper articles, essays, and other readings concerning history, culture, and current political, social, and simple economic issues in China, Taiwan, and Hong Kong. Prerequisite: Chinese 63, 64 or equivalent. C-L: Comparative Area Studies. One course each. *Staff*

141S. The Fantastic in Chinese Fiction in Translation. (AL) A survey of Chinese narrative convention with special emphasis on the genre of the fantastic in premodern fiction. Topics include the influence of Chinese literary conventions and religious modes on the fantastic in tales and full-length novels. C-L: Comparative Area Studies. One course. *Wang*

148S. Literature and Revolution: From the May Fourth to the Post-Mao Era. (AL) The cultural politics of Chinese writer-intellectuals from the May Fourth period, through Mao Zedong's Yen'an era, up to the 1980s. Chiefly modern and contemporary narrative fiction and films. C-L: Comparative Area Studies and Literature 148S. One course. *Wang*

183. Topics in Modern Chinese. (FL) Readings and other material, including films, television, and radio broadcasts. Exercises in composition. Prerequisite: Chinese 125, 126, 127, 129, or consent of instructor. C-L: Comparative Area Studies. One course. *Wang and Yao*

184. Topics in Modern Chinese. (AL, FL) Readings of modern short stories and essays on special topics of the cultural politics in modern and contemporary China. Additional materials such as films and television. C-L: Comparative Area Studies. One course. *Wang*

191, 192. Independent Study. One course each. *Staff*

Courses Offered in the Duke Study in China Program at Beijing Teachers College and Nanjing University

111A. Intensive Progress in Spoken Chinese—Intermediate Level. (FL) One course. *Staff*

111B. Intensive Progress in Reading Chinese—Intermediate Level. (FL) One course. *Staff*

112A. Intensive Progress in Spoken Chinese—Advanced Level. (FL) One course. *Staff*

112B. Intensive Progress in Reading Chinese—Advanced Level. (FL) One course. *Staff*

127A. Special Topics in Conversation and Composition—Intermediate Level. (FL) Discussion based on oral and written reports and topical readings. Aural comprehension practice. One course. *Staff*

127B. Special Topics in Reading—Intermediate Level. (FL) Reading and discussion of selections from modern Chinese literature, expository prose, and the Chinese press. One course. *Staff*

129A. Special Topics in Conversation and Composition—Advanced Level. (CZ, FL) Discussion based on oral and written reports and topical readings. Aural comprehension practice. One course. *Staff*

129B. Special Topics in Reading—Advanced Level. (CZ, FL) Reading and discussion of selections from modern Chinese literature, expository prose, and the Chinese press. One course. *Staff*

193. Directed Study. Reading and research culminating in a paper, on a topic approved and supervised by the resident director. One course. *Staff*

Courses Currently Unscheduled

135, 136. Introduction to Modern Chinese Literature. (AL, FL)

142S. Masterpieces of Chinese Literature in Translation. (AL)

146. Fundamentals of the Structure of Chinese. (FL)

147. Literature and Popular Culture in Taiwan: 1960s to the Present. (CZ)

166S. The *I Ching*, or *Book of Changes*. (CZ)

171. The Novel in Modern China. (AL, FL)

182S. Classical Readings in Chinese Philosophy. (CZ, FL)

185S, 186S. Seminar on Contemporary China. (CZ, FL)

HEBREW (HEB)

1, 2. Elementary Modern Hebrew. (FL) Introduction to speaking, understanding, reading, and writing modern Hebrew. Language laboratory. C-L: Judaic Studies. One course each. *Zakim*

63, 64. Intermediate Modern Hebrew. (FL) Reading, composition, conversation, and language laboratory. Prerequisite: Hebrew 1, 2 or equivalent. C-L: Judaic Studies. One course each. *Zakim*

125, 126. Advanced Modern Hebrew. (AL, FL) Proficiency in reading, writing, and speaking. Readings will include an introduction to modern Hebrew literature and current Israeli journalism. Prerequisite: Hebrew 63, 64 or equivalent. C-L: Judaic Studies. One course each. *Zakim*

181. Hebrew Literature in Translation: Culture and Ideology in Modern Hebrew Fiction. (AL) A critical examination of the Hebrew novel and novella of the past hundred years from a variety of theoretical perspectives, focusing on how modern Hebrew literature (and literature generally) engages and promotes particular modes of social and political existence. C-L: Judaic Studies. One course. *Zakim*

191, 192, 193, 194. Independent Study. One course each. *Staff*

HINDI-URDU (HIN)

1, 2. Elementary Hindi-Urdu. (FL) Conversation, basic grammar, and vocabulary; introduction to the Devanagari script and the reading of graded texts. Four hours of classroom work; two hours of language laboratory drill. One course each. *Khanna*

63, 64. Intermediate Hindi-Urdu. (FL) Reading, composition, and conversation. Four hours of classroom work, two hours of language drill. Prerequisites: Hindi-Urdu 1 and 2. One course each. *Khanna*

125, 126. Advanced Hindi. (FL) Proficiency in reading, writing, and speaking. Prerequisite: Hindi 63, 64 or equivalent. One course each. *Khanna*

191, 192. Independent Study. Directed reading and research. Open only to students with prior knowledge of Hindi-Urdu. One course each. *Khanna*

JAPANESE (JPN)

1, 2. Elementary Japanese. (FL) Introduction to speaking, understanding, reading, and writing. One course each. *Endo and staff*

10-11. Intensive Elementary Japanese. (FL) Intensive introduction to speaking, listening, reading, and writing Japanese. Offered only in the summer, in a nine-week special session. Twenty hours a week—equivalent to Japanese 1 and 2. Two courses. *Staff*

63, 64. Intermediate Japanese. (FL) Practice on advanced spoken and written patterns; reading and discussion. One course each. *Endo and staff*

125, 126. Advanced Japanese. (AL, FL) Readings and other materials, including video. Exercises in composition and conversation. C-L: Comparative Area Studies. One course each. *Staff*

161. Modern Japanese Fiction in Translation. (AL) An examination of the major forms of long and short fiction from 1880 to the present and of the tradition from which they arose. C-L: Comparative Area Studies. One course. *Dodd*

162. Premodern Japanese Literature. (AL) Introduction to Japanese history and culture through a reading of the classical literary canon in translation from earliest records to the beginning of the modern era. The nature of literature and its relations to other social practices will also be explored. Selections from the poetic, fictive, and dramatic genres and readings in mythology, diaries, and literary criticism. Taught in English. C-L: Comparative Area Studies. One course. *Dodd*

183, 184. **Topics in Japanese.** (AL, FL) Readings and other material, including television and radio broadcasts. Exercises in composition. Consent of instructor required. C-L: Comparative Area Studies. One course each. *Dodd*

191, 192. **Independent Study.** One course each. *Dodd*

193, 194. **Independent Study.** One course each. *Dodd*

Courses Currently Unscheduled

100. **Cultural Identification and Self-Identification in Modern Japan.** (AL)

175. **Structure of Japanese.** (FL)

KOREAN (KOR)

1, 2. **Elementary Korean.** (FL) Introduction to speaking, understanding, reading, and writing Korean. One course each. *Park Han*

63, 64. **Intermediate Korean.** (FL) Spoken and written Korean. One course each. *Park Han*

125, 126. **Advanced Korean.** (CZ, FL) Proficiency in speaking, aural comprehension, reading, and writing. Prerequisite: Korean 63, 64 or equivalent. C-L: Comparative Area Studies. One course each. *Park Han*

191, 192. **Independent Study.** One course each. *Staff*

Courses Currently Unscheduled

14. **Intensive Korean.** (FL)

PERSIAN (PER)

101, 102. **Introduction to Persian Literature.** (AL, FL) An introduction to classical Persian literature through the reading and translation of selected prose and poetry texts. Prerequisites: Persian 64 or the equivalent, and consent of instructor. One course each. *Lawrence*

Courses Currently Unscheduled

1, 2. **Elementary Persian.** (FL)

63, 64. **Intermediate Persian.** (FL)

SWAHILI (SWA)

1, 2. **Elementary Swahili.** (FL) Swahili language and culture with emphasis on conversation. Intensive work in language laboratory; drill sessions with native speakers. One course each. *O'Barr*

63, 64. **Intermediate Swahili.** (FL) Continuation of Swahili 1 and 2. Emphasis on contemporary Swahili literature. One course each. *O'Barr*

191, 192. **Independent Study.** One course each. *O'Barr*

Astronomy

For courses in astronomy, see Physics.

Biochemistry

For courses in biochemistry, see Medicine (School)—Graduate (School) Basic Science Courses Open to Undergraduates; also see Biology and Chemistry majors.

Biological Anthropology and Anatomy (BAA)

Professor Kay, *Chair*; Associate Professor Van Schaik, *Director of Undergraduate Studies*; Professors Cartmill, Glander, Hylander, Simons, and Terborgh; Associate Professors Roth and Smith; Assistant Professors Bassett, Maas, Pope, and White; Professor Emeritus La Barre; Associate Professor Emeritus Duke

A major is available in this department.

Biological Anthropology and Anatomy is an interdisciplinary department centering on the origin and evolution of human beings and their close biological relatives. The department and its course offerings have three general focuses: primate behavior and ecology, primate paleontology, and functional and comparative anatomy. Significant opportunities for independent research are found at the Duke Primate Center, which houses a unique and diverse range of nonhuman primates, especially prosimians from Madagascar. Advanced students can study original fossils and casts at the Primate Center and in the department's laboratories in the Medical Center, which also afford opportunities to study comparative anatomy from an adaptive and evolutionary perspective. Students interested in the Primatology Program should be aware that Biological Anthropology and Anatomy 93D is a program requirement. For further information on the Primatology Program contact the program chair at the department.

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

93. Introduction to Biological Anthropology. (NS) Origins and distribution; primate evolution; a survey of human paleontology and human biology, prehistory, and language; and the origins of human social organization and culture. One course. *Staff*

93D. Introduction to Biological Anthropology. (NS) Same as Biological Anthropology and Anatomy 93 except instruction is provided in two lectures and one small laboratory meeting each week. One course. *Staff*

132. Human Evolution. (NS) Evolutionary biology of the primates. Anatomical and behavioral adaptations and phylogeny of fossils and living primates including *Homo sapiens*. Prerequisites: Biological Anthropology and Anatomy 93 or equivalent. One course. *Cartmill, Glander, or Simons*

133. The Human Body. (NS) Human gross anatomy seen from a functional and evolutionary perspective. Laboratory involving study of prosected cadavers and other anatomical preparations. Prerequisites: Biological Anthropology and Anatomy 93. One course. *Cartmill or White*

143. Primate Ecology. (NS) A survey of primate ecology and behavior. Prerequisites: Biological Anthropology and Anatomy 93 or consent of instructor. One course. *Glander, Simons, Van Schaik, White, or staff*

144L. Primate Social Behavior. (NS) Evolutionary adaptation of communication, aggression, parental behavior, and sexual behavior. One course. *Glander, Pope, or White*

146. Sociobiology. (NS) Sociobiological theory reviewed and applied to the social behavior of nonhuman primates, hominids, and humans. Prerequisites: Biological Anthropology and Anatomy 93. One course. *Van Schaik*

151. Anatomy of the Lower Extremities. (NS) Introduction to the functional anatomy of the lower extremities. Does not count for biological anthropology and anatomy major requirements. Consent of instructor required. One course. *Bassett*

172S. Primate Anatomy. (NS) The comparative anatomy of primates from the perspective of adaptation and phylogeny. Laboratory includes some dissection or prosection of human and nonhuman primates. One course. *Kay or staff*

180. Current Issues in Biological Anthropology and Anatomy. (NS) Selected topics in methodology, theory, or area. One course. *Staff*

180S. Current Issues in Biological Anthropology and Anatomy. (NS) Same as Biological Anthropology and Anatomy 180 except instruction is provided in seminar format. One course. *Staff*

183. Primate Social Complexity and Intelligence. (NS) Information on primate social behavior and cognition used to examine ideas on the origins and functions of primate intelligence. Topics include communication, "ape language," alliances and reciprocity, deception and social manipulation, and the extent of awareness inferable from behavior in the wild and from experiments in captivity. One course. *Staff*

184. Conservation Biology of Primates. (NS) Introduction to the main concepts of conservation biology, both at the species and community level, using primate examples. Relevant aspects of primate distribution, ecology, and demography; threats to primate populations and their ecosystems, conservation strategies, and actual case studies. One course. *Van Schaik*

185. Current Issues in Primatology. (NS) Selected topics in primate behavior, ecology, and conservation. Consent of instructor required. One course. *Staff*

186S. Research Internship in Primatology. (NS) Consent of instructor required. See C-L: Interdisciplinary Course 186S. One course. *Glander or White*

187S. Senior Seminar in Primatology. (NS) Consent of instructor required. See C-L: Interdisciplinary Course 187S. One course. *Glander or White*

193. Independent Study. Directed reading and research. Open only to qualified seniors, with consent of Director of Undergraduate Studies. One course. *Staff*

195S, 196S. Senior Seminar. Prerequisites: BAA 93, a 100-level course in biological anthropology and anatomy, and consent of Director of Undergraduate Studies. One course each. *Staff*

For Seniors and Graduates

238. Functional and Evolutionary Morphology of Primates. (NS) History and functional significance of locomotor and feeding adaptations, craniofacial morphology, sense organs, and reproductive systems in primates, including *Homo sapiens*. Consent of instructor required. One course. *Cartmill, Kay, or staff*

244L, S. Comparative Primate Ecology. (NS) Comparisons of the evolutionary ecology of prosimians, monkeys, and apes. With field methods. Prerequisites: Biological Anthropology and Anatomy 93 and 143 recommended. One course. *Glander or White*

245S. Primate Social Evolution. (NS) Ecological determinants of, and biological constraints on, social strategies and systems. Emphasis on primates. Prerequisites: Biological Anthropology and Anatomy 93; 143, 144L, or 146; or consent of instructor. One course. *Van Schaik*

246. The Primate Fossil Record. (NS) A survey of fossil primates including early humans. The diversity, anatomy, and behavior of primates as related to the origin and

spread of past primates. The radiation of each main group of primates in the succession leading to humans illustrated with slides, casts, and fossils. Topics include geochemical dating, timing of molecular clocks, and various procedures for classifying primates. One course. *Simons*

247. The Hominid Fossil Record. (NS) Origin and successive stages of development of human ancestors. Detailed analysis of adaptive types and cultural developments. Personalities and current controversies in the study of hominid paleontology. Prerequisites: Biological Anthropology and Anatomy 93, 132, or consent of instructor. One course. *Simons*

248S. Evolution of Mammals. (NS) The origin, adaptive radiation, and phylogenetic relationships of mammals, as inferred from the fossil record. Consent of instructor required. One course. *Maas*

249S. Social Behavior and Evolutionary Change. (NS) The influence of social structure on rate and direction of evolutionary change, including speciation, with emphasis on primate social systems. Mating systems, dispersal patterns, and mechanisms of new social group formation examined from the perspective of their effects on the genetic structure of populations, and species radiations. Prerequisites: Biological Anthropology and Anatomy 143, or 144, or 146. One course. *Pope*

250. Biometry. (QR) A practically oriented overview of the statistical analysis of biological data. Topics include data collection and experimental design, methods and techniques of data organization, use of computing programs and packages, applications of appropriate parametric and nonparametric statistical techniques, assumptions and problems encountered with biological data analysis, and interpretation of results. Prerequisite: Mathematics 136, Psychology 117, Sociology 133, Statistics 10D, 110, 112, 114, 213, or equivalent. C-L: Environment 253. One course. *Gerhart and White*

280S, 281S. Seminar in Selected Topics. (NS) Special topics in methodology, theory, or area. Consent of instructor required. One course each. *Staff*

287S. Macroevolution. (NS) Evolutionary patterns and processes at and above the species level; species concepts, speciation, diversification, extinction, ontogeny and phylogeny, rates of evolution, and alternative explanations for adaptation and evolutionary trends. Prerequisites: Biology 21L and 22L or equivalents. C-L: Biology 287S. One course. *Roth*

289. Comparative Mammalian Anatomy. (NS) A practical survey of anatomical diversity in mammals. An emphasis on dissections of a broad variety of mammals. A broader perspective on specific anatomical features provided in the lectures. One course. *Staff*

290. Pattern and Process in Vertebrate Development. (NS) Research results on developmental processes applied to classic problems of comparative vertebrate biology. Specific focus to vary, but to include cell differentiation and migration, induction, cell-cell interaction and cell mechanics as well as craniofacial morphogenesis, development and evolution, developmental constraints and comparative embryology. Prerequisites: course in comparative or human anatomy and consent of instructor. C-L: Biology 290. One course. *Smith*

292S. Topics in Morphology and Evolution. (NS) Various aspects of vertebrate morphology and evolution, including major historical approaches to the interpretation of morphology; the evolution, development, and function of specific morphological structures; and patterns of vertebrate evolution. Consent of instructor required. One course. *Smith*

COURSES CURRENTLY UNSCHEDULED

293, 294. Evolutionary Theory. (NS)

THE MAJOR

For the A.B. Degree

Prerequisite. Biological Anthropology and Anatomy 93 or 93D.

Corequisites. Cultural Anthropology 94, 94D, or 100; and Biology 21L or 22L or 74L.

Major Requirements. Eight courses are required, not including the above prerequisites and corequisites, distributed in the following manner:

—Biology Anthropology and Anatomy 132.

—At least four courses selected from the Biological Anthropology and Anatomy present course listings (with the exception of Biological Anthropology and Anatomy 151).

The remaining courses may be selected from Biological Anthropology and Anatomy courses numbered 100 or above or from approved courses in other social and biological sciences departments (for example, Biology 108L, 110L, 149, 201L, S, 215, 234S, 237L, and 287S; Psychology 103, 111, and 150S.)

For the B.S. Degree

Prerequisite. Biological Anthropology and Anatomy 93 or 93D.

Corequisites. Biology 21L or 22L or 74L, or equivalent; Chemistry 11L, 12L, and 151L; Mathematics 31 and 32; Physics 51L and 52L, or 53L and 54L.

Major Requirements. Eight courses are required in the biological and geological sciences, not including the above prerequisites and corequisites. Of these eight courses, at least five courses must be selected from the Biological Anthropology and Anatomy present course listings; up to three courses in other biological sciences, psychology, or geology, approved by the advisor. One of these eight courses must include related laboratory/field experience; an independent study course may be counted toward the laboratory/field experience requirement. At least one of the courses must concern statistics or quantitative methods (Biological Anthropology and Anatomy 250, Statistics 100 level or Psychology 117, or equivalent). At least two of these eight courses must be at the 200 level. Geology 72 is strongly encouraged for students with interests in paleontology.

Honors/Distinction. Qualified majors are encouraged to participate in special work leading to graduation with distinction in biological anthropology and anatomy. See the section on honors in this bulletin for general requirements. Any major with a *B+* average (3.3 gpa) in biological anthropology and anatomy courses and with a *B* average (3.0 gpa) in all courses is eligible. Students who desire to undertake honors work should request a member of the biological anthropology and anatomy faculty to recommend their names to the director of undergraduate studies. To receive departmental honors a major must complete a paper involving significant independent research or scholarship and pass an oral examination on the paper conducted by an appointed committee of faculty members, at least two of whom should be in biological anthropology and anatomy. Normally, students will prepare their papers over the course of the senior year working in close collaboration with their committees and receiving on the average two course credits in independent study for the work.

Biology (BIO)

Faculty in Botany: Professor Searles, *Chair*; Associate Professor Vilgalys, *Associate Director of Undergraduate Studies in Biology*; Professors Antonovics, Barber, Boynton, Christensen, W. Culberson, Ramus, Reynolds, Schlesinger, Siedow, Stone, Strain, Terborgh, White, and R. Wilbur; Associate Professor Knoerr; Assistant Professors Baldwin,

Clark, Dong, B. Kohorn, and Sun; Professors Emeriti Anderson, Billings, Hellmers, Kramer, Naylor, and Philpott; Research Professors C. Culberson and Patterson; Associate Research Professor Harris; Adjunct Professor Osmond; Adjunct Associate Professors Funk, Kress, Lacey, Mishler, Wagner, and Zimmer; Lecturers Armaleo and Bush

Faculty in Zoology: Professor H. Nijhout, *Chair*; Professor Emeritus Fluke, *Director of Undergraduate Studies in Biology*; Professors Barber, Brandon, Forward, Gillham, Klopfer, Laurie, Livingstone, McClay, Nicklas, Rausher, Simons, Staddon, Terborgh, Tucker, Uyenoyama, Vogel, Wainwright, and Ward; Associate Professors Rittschof, Roth, and K. Smith; Assistant Professors Crenshaw, Cunningham, Fehon, Morris, and Nowicki; Professors Emeriti Bailey, Bookhout, Costlow, Gregg, Schmidt-Nielsen, and K. Wilbur; Assistant Professors of the Practice Mercer and Motten; Research Assistant Professor Roach; Adjunct Professor Schmidt-Koenig; Adjunct Associate Professor M. Nijhout

A major is available in biology.

The biology courses and the biology major are cooperatively administered by the Department of Botany and the Department of Zoology. Additional courses in biosciences are offered by the departments of Biological Anthropology and Anatomy, Chemistry, and Psychology in Trinity College of Arts and Sciences; by the basic sciences departments in the School of Medicine; and by the schools of Engineering and of the Environment.

Biology 21L and 22L constitute the normal introductory courses for students planning to major in the biological sciences and are prerequisites for intermediate and advanced courses in biology. The two courses may be taken in either order, and students majoring in biology may take their second course in the sequence concurrently with an intermediate level course, as appropriate. For nonmajors, either course, or both, may count for the area requirement in the natural sciences. Biology 19 also meets the introductory requirement by advanced placement. Biology 20L by transfer credit meets one semester of the requirement.

10L. Marine Biology. (NS) Physical and chemical characteristics of marine ecosystems and the functional adaptations of marine organisms to these systems. Lectures, field trips, and laboratories. For students not majoring in a natural science. (Given at Beaufort.) C-L: Marine Sciences. One course. *Staff*

19. General Biology. Credit for advanced placement on the basis of the College Board Examination in biology. Equivalent to Biology 21L and 22L as prerequisite. One course.

20L. Introductory Biology. (NS) Credit for introductory biology by transfer of college-level work not corresponding to either Biology 21L or 22L in content, but including laboratory work. May be counted toward Natural Sciences Area of Knowledge. One course.

21L. Introduction to Organismal and Environmental Biology. (NS) The basic principles of genetics, population genetics, evolution, ecology, and physiology of animals and plants. The diversity and phylogeny of unicellular organisms and of plants. May be taken before or after Biology 22L. One course. *Motten and staff*

22L. Introduction to Cellular and Developmental Biology. (NS) The basic principles of cell biology, photosynthesis, metabolism, molecular biology, immunology, and development of animals and plants. The diversity and phylogeny of animals. May be taken before or after Biology 21L. One course. *Motten and staff*

43D. Ecology and Society. (NS) Ecological concepts and their application to human society. Intended for nonscience majors. One course. *Bush*

45S. Structure. The structural design principles that underlie function, failure, and fancy in natural and manmade things. Gaps and connections between science and art. Lectures and tasks for minds and hands on worldly designs. Does not count toward the areas of knowledge requirements. C-L: Institute of the Arts 205. One course. *Wainwright*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

50. Life's Beginnings. (NS) Cells, molecules, and evolution from the start. The origin and evolution of life on earth as a case study in science as a human enterprise and as a way of knowing. Intended for non-biology majors. One course. *Nicklas*

53. Introductory Oceanography. (NS) Basic principles of physical, chemical, biological, and geological oceanography. Fee for required field trip to the Marine Laboratory. C-L: Geology 53. One course. *Pilkey (geology) and Searles*

60. Biogeography in an Australian Context. (NS) Distribution of plants and animals in space and time as determined by the interaction of geophysics, geology, climate, and evolutionary history. Special emphasis on the unique terrestrial and marine faunas and floras of the Australian continent. One course. *Searles*

90. Plants and Civilization. (NS) The biological nature of crop plants, the world's major economic plants, and the origins and evolution of agriculture. One course. *W. Culberson or R. Wilbur*

92S. Social Implications of Genetics. (NS) The positive and negative implications of genetics for society. Development of the field of human genetics in parallel with the science as a whole and investigation of the advances that have occurred in the diagnosis, treatment, and prevention of genetic disease. Open only to students in the FOCUS Program. One course. *Staff*

93S. Changing Human Environments. (NS) General patterns of change in global environments during the past four million years explored in relation to prehistoric and historic evolution. The reciprocal relationships between landscape and global ecological change and human land use. The potential future role of these relationships. Open only to students in the FOCUS Program. One course. *Antonovics*

100. Perspectives on Living Systems. (NS) For upperclass students not intending majors in a biological science. One course. *Staff*

102. Trees and Shrubs of North Carolina. (NS) Identification and natural history of the trees, shrubs, and woody vines. Emphasis on those cultivated or occurring naturally in North Carolina. One course. *R. Wilbur*

103L. General Microbiology. (NS) Classical and modern principles of the structure, physiology, and genetics of microorganisms and their roles in human affairs. Prerequisite: one course in a biological science or consent of instructor. One course. *Vilgalys*

108L. Developmental and Comparative Anatomy of Vertebrates. (NS) The embryology, anatomy, and evolutionary development of vertebrate organ systems. Prerequisites: Biology 21L and 22L. One course. *Staff*

110L. Ecology. (NS) Physical, chemical, and biological processes that determine the distribution and abundance of plants and animals, emphasizing physiological responses, population dynamics, species interaction, biogeography, nutrient cycling, and energy flow through food webs. Laboratory includes fieldwork. Prerequisites: Biology 21L and 22L; and Mathematics 31. One course. *Livingstone and Schlesinger, or Morris and Reynolds*

113L. Behavioral Ecology. (NS) How ecological factors shape foraging, mating, aggressive, and social behavior. Laboratory experiments and field observations from the Outer Banks environment. Independent projects and seminars. (Given at Beaufort.)

Prerequisites: Biology 21L and 22L. C-L: Marine Sciences. One course. *Rubenstein (visiting summer faculty)*

114L. Biological Oceanography. (NS) Physical, chemical, and biological processes of the oceans, emphasizing special adaptations for life in the sea and factors controlling distribution and abundance of organisms. Laboratory emphasis. One course (spring); one and one-half courses (summer). (Given at Beaufort.) Prerequisites: Biology 21L and 22L. C-L: Marine Sciences. Variable credit. *Ramus or staff*

115L. The Ocean's Role in Climate. (NS) Examination of how biogeochemical processes in the oceans regulate chemical properties of the atmosphere and in turn control the thermal dynamics of the earth system, with emphasis on ocean processes that regulate the concentration of the greenhouse gasses in the earth's atmosphere, providing a basic understanding of the earth's climate system. (Given at Beaufort.) Prerequisite: one year of biology or geology; Biology/Geology 53 recommended. C-L: Marine Sciences. One and one-half courses. *Barber*

117L. Biology of Marine Macrophytes. (NS) Physiology and ecology of seaweeds, seagrasses, marshgrasses, and mangroves. Biological flux of carbon and nutrients in coastal seas. Ecological consequences of photosynthetic adaptations. (Given at Beaufort.) Prerequisites: Biology 21L and 22L; and Chemistry 11L, 12L or equivalent. C-L: Marine Sciences. One course. *Ramus*

120. Principles of Evolution. (NS) Evidence for evolution; mechanisms of micro- and macro-evolutionary change. Genetic change in populations. Ecological, behavioral, molecular forces influencing genetic change. Speciation; phylogenetic reconstruction. Prerequisite: Biology 21L. One course. *Antonovics, Rausher, or Roth*

123. Analysis of Ocean Ecosystems. (NS) The history, utility, and heuristic value of the ecosystem; ocean systems in the context of Odum's ecosystem concept; structure and function of the earth's major ecosystems. (Given at Beaufort.) Prerequisite: one year of biology, one year of chemistry, or consent of instructor. C-L: Marine Sciences. One course. *Barber*

140L. Plant Diversity. (NS) Major groups of living plants, their evolutionary origins and phylogenetic relationships. Fee for field trip. Prerequisite: introductory biology. One course. *Searles or R. Wilbur*

142L. Plant Systematics. (NS) Surveys major groups. Principles of vascular plant taxonomy with practice in identification of local flora. Lectures, laboratories, and field trips. One course. *R. Wilbur*

150L. Physiology of Marine Animals. (NS) Environmental factors, biological rhythms, and behavioral adaptations in the comparative physiology of marine animals. One course (fall); one and one-half courses (summer). (Given at Beaufort.) Prerequisites: Biology 21L and 22L; and chemistry. C-L: Marine Sciences. Variable credit. *Forward*

151L. Principles of Animal Physiology. (NS) Functional aspects of respiration, circulation, neural and hormonal coordination, water balance, metabolism, thermoregulation, and responses to special environments. Prerequisites: Biology 22L and Chemistry 12L. One course. *Crenshaw or Tucker*

152. Molecular Basis of Plant Functioning. (NS) Principal physiological processes of plants, including respiration, photosynthesis, water relations, and factors associated with plant morphogenesis. Prerequisites: Biology 21L and one year of chemistry; organic chemistry is desirable. One course. *Siedow and Sun*

154. Principles of Neurobiology. (NS) Introduction to neuroscience, including basic physiology, microstructure, and anatomy of neural tissues; mechanisms of neuronal

development and integration; sensory-motor control; the neural foundations of animal behavior, and the evolution of nervous systems. Prerequisites: Biology 21L and 22L, and Chemistry 12L or equivalent. C-L: Psychology 135. One course. *Nowicki*

155L. Biochemistry of Marine Animals. (NS) Functional, structural, and evolutionary relationships of biochemical processes of and importance to marine organisms. (Given at Beaufort.) Prerequisites: Biology 21L and 22L; Chemistry 11L, 12L. C-L: Marine Sciences. One course. *Rittschof*

160. Principles of Cell Biology. (NS) Structure and function of organelles, metabolism, and regulatory mechanisms. Prerequisites: Biology 22L and Chemistry 12L. One course. *Kohorn, McClay, or M. Nijhout*

164. Developmental Biology. (NS) Principles and problems of development and differentiation. Embryology, molecular and cellular mechanisms of determination, embryonic induction, and differentiation; developmental genetics, morphogenesis, and pattern formation. Attention to current literature. Prerequisite: Biology 160. C-L: The University Program in Genetics. One course. *Fehon*

169L. Marine Communities. (NS) Dynamics of marine communities in the context of current ecological theory. Life history strategies, competition, predation, diversity, and stability; detailed considerations of benthic and pelagic communities. (Given at Beaufort.) Prerequisites: Biology 21L and 22L, and Mathematics 31. C-L: Marine Sciences. One course. *Gerhart (environment)*

176L. Marine Invertebrate Zoology. (NS) Structure, function, and development of invertebrates collected from estuarine and marine habitats. Not open to students who have taken Biology or Zoology 274L. One course (fall); one and one-half courses (summer). (Given at Beaufort.) Prerequisites: Biology 21L and 22L. C-L: Marine Sciences. Variable credit. *Kirby-Smith (environment)*

180. Principles of Genetics. (NS) Structure and properties of genes and chromosomes in individual organisms and in populations. Prerequisites: Biology 21L and 22L. C-L: The University Program in Genetics. One course. *Antonovics, Boynton, Gillham, and Laurie*

184L. Experimental Cell and Molecular Biology. (NS) Experimental approaches to contemporary questions in cell and molecular biology. Practical laboratory training in molecular genetics, protein chemistry and other methods used in the rapidly developing field of biotechnology. Experiments include cloning and sequencing genes, characterizing gene regulation and exploring protein structure/function relationships and subcellular localization. Prerequisite: Biology 160 or 180. One course. *Armaleo, Dong, Kohorn, Siedow, or Sun*

191, 192. Independent Study. For junior and senior majors with consent of Director of Undergraduate Studies and supervising instructor. Three courses of 191, 192, 193T, and 194T, maximum. Variable credit. *Staff*

193T, 194T. Tutorial. (NS) For junior and senior majors with consent of Director of Undergraduate Studies and supervising instructor. Three courses of 191, 192, 193T, and 194T, maximum. Variable credit. *Staff*

195S, 196S. Seminar in Biology. (NS) Variable credit. *Staff*

199S. The Changing Biosphere: Past, Present, and Future. (NS) Consent of instructor required. See C-L: Distinguished Professor Course 199S. One course. *Billings*

For Seniors and Graduates

201L, S. Animal Behavior. (NS) Survey of past developments and current controversies in animal behavior. Extensive readings, followed by individual experimental or

descriptive projects in the laboratory or field (or Primate Center). Recommended background: Biology 21L and 22L, Biology 151L, and statistics, or equivalents. One course. *Klopper*

203L. Marine Ecology. (NS) Factors that influence the distribution, abundance, and diversity of marine organisms. Course structure integrates lectures, field excursions, and independent research projects. Topics include characteristics of marine habitats, adaptation to environment, species interactions, biogeography, larval recruitment, rocky shores, marine mammals, fouling communities, tidal flats, beaches, subtidal communities, and coral reefs. (Given at Beaufort.) Prerequisite: none; suggested—introductory ecology, invertebrate zoology, or marine botany. C-L: Environment 219L and Marine Sciences. One and one-half courses. *Gerhart (environment)*

206S. Controversies in Biology. (NS) A contentious theme for reading, discussion, and an individual or joint paper. Illustrative past topics: the nature of the creative process, causality in biological thought, the lack of political impact of many scientific developments. Open to nonmajors. One course. *Klopper*

209L. Lichenology. (NS) Morphology, systematics, and biological and ecological implications of the lichens. Collection and identification of specimens and the use of lichen chemistry in taxonomy. One course. *C. Culberson and W. Culberson*

210L. Bryology. (NS) Morphological, systematic, and ecological characteristics of mosses and liverworts. One course. *Staff*

212L, S. Phycology. (NS) Morphological and ecological characteristics of common freshwater and marine algae and principles of their classification. One course. *Searles*

215. Tropical Ecology. (NS) Ecosystem, community, and population ecology of tropical plants and animals with application to conservation and sustainable development. Prerequisite: a course in general ecology. C-L: Environment 217. One course. *Terborgh*

216L. Limnology. (NS) Lakes, ponds, and streams; their origin, development, geochemistry, energy balance, productivity, and the dynamics of plant and animal communities. Laboratory includes field trips. Offered biennially. Prerequisites: Biology 21L and 22L, and Chemistry 12L and Mathematics 32 and physics; or equivalents; or consent of instructor. One course. *Livingstone*

218L. Barrier Island Ecology. (NS) An integration of barrier island plant and animal ecology within the context of geomorphological change and human disturbance. Topics include: barrier island formation and migration, plant and animal adaptations, species interactions, dune succession, maritime forests, salt marshes, sea level rise, conservation policy, and restoration ecology. Field trips to many of the major North Carolina barrier islands. Strong emphasis on field observation and independent research. (Given at Beaufort.) Prerequisite: introductory biology; suggested: course in botany or ecology. C-L: Environment 218L and Marine Sciences. One and one-half courses. *Evans, Peterson, and Wells (visiting summer faculty)*

220L. Mycology. (NS) Survey of the major groups of fungi with emphasis on life history and systematics. Field and laboratory exercises. One course. *Vilgalys*

222L. Entomology. (NS) The biology of insects: diversity, development, physiology, and ecology. Field trips. Prerequisites: Biology 21L and 22L or equivalents. One course. *H. Nijhout*

229L, S. Paleocology. (NS) Global change over the last two million years. Prerequisites: two semesters of biology or geology; and one semester each of calculus, chemistry, and physics; or consent of instructors. One course. *Bush, Clark, and Livingstone*

232. Microclimatology. (NS) Introduction to the micrometeorological processes. Discussion of the integration of these processes and the resulting microclimates in the rural (forest, field, and water surface) and urban environments. Methods for modification of the microclimate. C-L: Environment 232. One course. *Knoerr*

234S. Problems in the Philosophy of Biology. (NS) Consent of instructor required. See C-L: Philosophy 234S. One course. *Brandon*

237L. Systematic Biology. (NS) Theory and practice of identification, species discovery, phylogeny reconstruction, classification, and nomenclature. Prerequisites: Biology 21L and 22L or equivalents. One course. *Staff*

241. Field Botany. (NS) Identification and recognition of the vascular flora of the Carolinas. Frequent field trips to representative habitats. Prerequisite: introductory plant identification course or consent of instructor. One course. *R. Wilbur*

243L. Evolution and Classification of Angiosperms. (NS) Characteristics and phylogenetic relationships of major flowering plant lineages. Emphasis on current literature, rigorous methods, modern controversies, and biological and biogeographic implications of relationships. Prerequisite: Biology 142L or equivalent. One course. *Baldwin, Funk, Kress, and Wagner*

244. Principles of Immunology. (NS) An introduction to the molecular and cellular basis of the immune response. Topics include anatomy of the lymphoid system, lymphocyte biology, antigen-antibody interactions, humoral and cellular effector mechanisms, and control of immune responses. Prerequisites: Biology 160 and Chemistry 151L or equivalents. C-L: Immunology 244. One course. *Kostyu (immunology), McClay, and staff*

249. Comparative Biomechanics. (NS) The structure and operation of organisms in relation to the mechanics of solids and fluids, including readings from the primary literature. Not open to students who have taken Biology 149. Prerequisites: Mathematics 31 and Physics 51L or equivalents. One course. *Vogel and Wainwright*

256L, S. Plant Biosystematics. (NS) Descriptive and experimental procedures used to assess systematic implications of plant evolution. Laboratory, discussion, and field-oriented problems. Prerequisites: basic courses in systematics and genetics. One course. *Baldwin*

257L. Molecular Systematics and Evolution. (NS) Descriptive and experimental procedures used to assess evolutionary diversity for analysis of population genetics and systematic relationships. Laboratory problems, discussion, and individual research projects. Prerequisites: basic course work in systematics, evolution, and genetics. One course. *Vilgalys*

259L. Laboratory in Biomechanics. (NS) Introduction to instruments used in investigations of solid and fluid biomechanics. Exercises and individual projects. Prerequisites: Biology 249 and consent of instructor. One course. *Vogel and Wainwright*

261. Photosynthesis. (NS) Principles of photosynthesis: developmental, mechanistic, regulatory, and ecological aspects of the photosynthetic process. Prerequisite: Biology 152 or equivalent. One course. *Siedow*

262. Biology of Parasitism. (NS) How parasites, from viruses through vertebrates, have solved the special problems associated with their dependence on other organisms. Emphasis on life cycles, host-parasite interactions, and experimental parasitology. Intended for seniors. Prerequisites: Biology 22L and 160 or equivalents. One course. *M. Nijhout*

265L. Physiological Plant Ecology. (NS) The physiological approach to interpreting adaptation in plants, with emphasis on terrestrial seed plants. Prerequisites: Biology 110L and 152 or equivalents. One course. *Strain*

267L. Community Ecology. (NS) Mechanisms that determine the distribution and abundance of plants and animals: geology, climate, physiography, soils, competition, predation, and history. Lectures focus on ecological principles. Seminars and weekend field trips. Prerequisites: an introductory ecology course and consent of instructor. One course. *Christensen*

269. Advanced Cell Biology. (NS) Structural and functional organization of cells and their components with emphasis on current research problems and prospects. Prerequisite: introductory cell biology or consent of instructor. C-L: Cell and Molecular Biology, Cell Biology 269, Immunology 269, and Microbiology 269. One course. *Nicklas and staff*

272. Biogeochemistry. (NS) Processes controlling the circulation of carbon and biochemical elements in natural ecosystems and at the global level, with emphasis on soil and surficial processes. Prerequisite: Chemistry 12L or equivalent. C-L: Geology 272. One course. *Schlesinger*

274L. Biology of Marine Invertebrates. (NS) Structures, functions, and habits of invertebrate animals under natural and experimental conditions. Field trips. Not open to students who have taken Biology 176L. (Given at Beaufort.) Prerequisites: Biology 21L and 22L or equivalents. C-L: Environment 297L and Marine Sciences. One and one-half courses. *Staff*

281. DNA, Chromosomes, and Evolution. (NS) The relationship of chromosome and DNA-sequence organization with evolution; karyotype changes and speciation; repetitive DNA, split genes, transposable elements, and evolutionary mechanisms; phylogeny reconstruction; evolution of mitosis and the chromosome cycle. Prerequisite: an introductory course in genetics or cell or molecular biology, or consent of instructor. C-L: The University Program in Genetics. One course. *Laurie and Nicklas*

283. Molecular Genetics of Organelles. (NS) Genetics, biochemistry, and molecular biology of the organelles of eukaryotic cells, and cellular symbionts. Emphasis on recent literature. Prerequisite: introductory genetics. C-L: The University Program in Genetics. One course. *Boynton and Gillham*

285S. Ecological Genetics. (NS) Interaction of genetics and ecology and its importance in explaining the evolution, diversity, and distribution of plants and animals. Prerequisites: Biology 180 and 286 or equivalents. C-L: The University Program in Genetics. One course. *Antonovics*

286. Evolutionary Mechanisms. (NS) Population ecology and population genetics of plants and animals. Fitness concepts, life history evolution, mating systems, genetic divergence, and causes and maintenance of genetic diversity. Prerequisites: Biology 21L and 22L, and Biology 180 or equivalents. C-L: The University Program in Genetics. One course. *Antonovics, Rausher, and Uyenoyama*

287S. Macroevolution. (NS) Evolutionary patterns and processes at and above the species level; species concepts, speciation, diversification, extinction, ontogeny and phylogeny, rates of evolution, and alternative explanations for adaptation and evolutionary trends. Prerequisites: Biology 21L and 22L or equivalents. C-L: Biological Anthropology and Anatomy 287S. One course. *Roth*

288. Mathematical Population Genetics. (NS) Principles of formulation and analysis of dynamic mathematical models of genetic evolution. Rotating topics include: mating systems, sex ratio, stochastic processes. Prerequisites: calculus; statistics and

linear algebra recommended. C-L: The University Program in Genetics. One course. *Uyenoyama*

289. Methods in Morphometrics. (QR) Techniques for the acquisition and analysis of quantitative data for describing and comparing biological form. Topics include: image capture and analysis, two- and three-dimensional digitization, and multivariate and geometric techniques such as allometric analysis, outline and landmark-superposition methods, and deformation models. Background in statistics and linear algebra recommended. One course. *Mercer*

290. Pattern and Process in Vertebrate Development. (NS) Prerequisites: course in comparative or human anatomy and consent of instructor. See C-L: Biological Anthropology and Anatomy 290. One course. *Smith*

295S, 296S. Seminar. (NS) Variable credit. *Staff*

COURSES CURRENTLY UNSCHEDULED

96D. Human Sex and Sexuality

145. Physical Radiations and Biological Significance. (NS)

219L. Benthic Marine Algae. (NS)

THE MAJOR

The Bachelor of Arts and the Bachelor of Science degrees are offered with a major in biology or in an individually designed interdepartmental concentration approved by the director of undergraduate studies in biology. Information about the biology major may be obtained in the office of the director of undergraduate studies.

For the A.B. Degree

This degree program is the general liberal arts major program. Students contemplating a career in biological or biomedical sciences should elect the program leading to the B.S. degree.

Prerequisites. Biology 21L and 22L, or equivalent.

Corequisites. Chemistry 11L, 12L; Mathematics 31, 32; plus three science-related courses outside the biological sciences selected from an approved list of such courses.

Major Requirements. A minimum of eight full courses in at least eight course registrations in the biosciences, not including the above prerequisites and corequisites or courses specified not for science majors; two of these courses must include related laboratory experience; one laboratory independent study course may be counted toward the laboratory requirement. The eight courses must include one core course from each of three areas: cell biology and genetics; organism structure and function; and ecology, evolution, and systematics. These courses are prerequisites to many of the advanced courses in these subject areas. Five of these eight courses must be in biology. The remaining courses may be elected from among courses numbered 100 or above in biology, or from approved courses in the basic science departments of the School of Medicine, or from approved courses of a basic biological character in related departments. The elective courses acceptable for a biology major with an area of concentration (see below) are defined by the requirements for that concentration. At least one of these eight courses must be at the 200 level.

For the B.S. Degree

This is the program in biology for students contemplating a career in biological or biomedical sciences.

Prerequisites. Biology 21L and 22L, or equivalent.

Corequisites. Chemistry 11L, 12L, and 151L; Mathematics 31, 32; Physics 51L or 53L and 52L or 54L. Additional corequisites may be required for particular areas of concentration (see below).

Major Requirements. A minimum of eight full courses in at least eight course registrations in the biosciences, not including the above prerequisites and corequisites or courses specified not for science majors; two of these courses must include related laboratory experience; one laboratory independent study course may be counted toward the laboratory requirement. The eight courses must include one core course from each of three areas: cell biology and genetics; organism structure and function; and ecology, evolution, and systematics. These courses are prerequisites to many of the advanced courses in these subject areas. Five of these eight courses must be in biology. The remaining courses may be elected from among courses numbered 100 or above in biology, or from approved courses in the basic science departments of the School of Medicine, or from approved courses of a basic biological character in related departments. The elective courses acceptable for a biology major with an area of concentration (see below) are defined by the requirements for that concentration. At least one of these eight courses must be at the 200 level.

For Areas of Concentration

Students may elect to complete requirements in specified areas of concentration. Currently available areas of concentration in the biology major are: animal behavior, cell and molecular biology, evolutionary biology, genetics, marine biology, neuroscience, pharmacology, and plant systematics. Certification in an area of concentration is designated on the official transcript. For information on areas of concentration see the director of undergraduate studies.

The Negotiated Major

As an alternative to the above programs, a student with unusual interests in biology may arrange a negotiated concentration of study. After appropriate discussion with departmental faculty, a student may devise a program of study which must be endorsed by two members of the faculty and approved by the director of undergraduate studies. The statement of the proposed program must make clear why the negotiated major is more appropriate than a conventional major. Such a program must be arranged before the start of a student's fifth semester. The only formal limitation on this approach to the major is that it include at least five courses in biology to meet minimum Trinity College requirements.

Honors/Distinction

A program for graduation with distinction in biology is available. See the section on honors in this bulletin. The director of undergraduate studies can provide more details.

Botany (BOT)

Professor Searles, *Chair*; Professors Antonovics, Barber, Boynton, Christensen, W. Culberson, Ramus, Reynolds, Schlesinger, Siedow, Stone, Strain, Terborgh, White, and R. Wilbur; Associate Professors Knoerr and Vilgalys; Assistant Professors Baldwin, Clark, Dong, B. Kohorn, and Sun; Professors Emeriti Anderson, Billings, Hellmers, Kramer, Naylor, and Philpott; Research Professors C. Culberson and Patterson; Associate Research Professor Harris; Adjunct Professor Osmond; Adjunct Associate Professors Funk, Kress, Lacey, Mishler, Wagner, and Zimmer; Lecturers Armaleo and Bush

See Biology for a description of the major and the list of courses taught by the botany faculty.

Canadian Studies Program

Professor Thompson (history), *Director*; Professors Davis (history), Kornberg (political science), Maddox (sociology), Paletz (political science), Richardson (environment), J. Smith (sociology), Tiryakian (sociology), Warren (community and family medicine), and Wood (history); Associate Professor Kimbrough (economics); Assistant Professors Mayer (public policy) and S. Smith (public policy); Professors Emeriti Cahow (history), Preston (history), and Tuthill (economic geography); Associate Professor Emeritus Hull (Romance studies); Research Professor Davidson (international studies); Adjunct Professor Steen (environment); Adjunct Associate Professors Keineg (Romance studies) and Wilson (history)

A second major or a certificate is available in this program.

The program in Canadian Studies seeks to provide the student with an understanding of Canada and its problems and prospects. Students may undertake the program to supplement another major, or to complete a second major in Canadian Studies, or as part of an interdepartmental concentration, or under Program II. Canadian Studies may also be an area concentration in the comparative area studies major, described elsewhere in this bulletin. See sections below on the program and the major. The courses are described in the departmental and interdisciplinary listings.

COURSES WITH CANADIAN CONTENT

The following courses count as one course in the five required for the program in Canadian Studies and in the eight required for the major in Canadian Studies. Independent studies may also be arranged with Canadian Studies faculty.

Economics

265. International Trade and Finance. *Kimbrough and Tower*

English

179S. Repairing the Continent: Canadian and United States Literary Perspectives. *A. Davidson*

186S,A. Canadian Literature in English. *A. Davidson*

288. Margaret Atwood. *A. Davidson*

French

131S. French in the New World. *Thomas*

169. The Contemporary Novel in French Canada. *Keineg*

Health Administration

Students interested in this area should consult the director of the Canadian Studies Program.

History

106S. Geography of Canada. *Tuthill*

108C. Canadian-American Relations. *Thompson*

119A. Native American History. *Wood*

121B. The United States as a World Power: 1861-1940. *Davis*

166S. American Dreams / American Realities. *Wilson*

183S. Canada from the French Settlement. *Thompson*

195S.45. Canadian and American Agrarian Movements. *Thompson*

196S.24. Problems in Recent United States Diplomatic History. *Davis*

216S. United States Diplomacy, 1890-1945. *Davis*

Interdisciplinary Courses

98. Introduction to Canada. C-L: Economics 98, History 98, Political Science 98, and Sociology 98.

LeClere or Thompson

182. Media in Comparative Perspective. C-L: Political Science 182 and Sociology 182. *J. Smith*

184S. Canadian Issues. C-L: Comparative Area Studies, Cultural Anthropology 184S, Economics

184S, History 184S, Political Science 184S, and Sociology 184S. *Staff*

282S. Canada: Research Seminar. C-L: Comparative Area Studies, Cultural Anthropology 282S,

Economics 282S, History 282S, Political Science 282S, and Sociology 282S. *Staff*

Political Science

117. Comparative Government and Politics: Selected Countries. *Staff*

182. Media in Comparative Perspective. *J. Smith*

- 203S. *Issues in Politics and the Media in the United States. Paletz*
266S. *Comparative Social Policy. S. Smith*
277. *Comparative Party Politics. Lange*

Public Policy Studies

- 265S. *The Process of International Negotiation. C-L: Political Science 265S. Mayer*

Sociology

167. *The Social Bases of Politics. Gereffi or J. Smith*
171. *Comparative Health Care Systems. Maddox*
179. *Modern Nationalist Movements. Tiryakian*
182. *Media in Comparative Perspective. J. Smith*
222. *The State and Communications Policy. J. Smith*
255. *Political Sociology. J. Smith or Tiryakian*

THE CERTIFICATE

In the Canadian Studies Certificate Program, a student must take five courses with Canadian content. These must include Interdisciplinary Course 98, one upper-level seminar, and three other Canadian Studies courses. Students who do not have the equivalent of two years of college-level French are strongly encouraged to take French 21 and 22, Accelerated French.

THE MAJOR

Corequisite. Completion of another major.

Major Requirements. Eight courses in Canadian Studies. These must include Interdisciplinary Course 184S and seven other semester-course credits in courses on Canada, some of which may be fulfilled by independent study or special reading courses. No more than two courses required for the first major may be counted for a Canadian Studies major. To complete the major in Canadian Studies a student must also take at least two full years of college-level French, or must possess an equivalent competence in the language as certified by the Department of Romance Studies.

For further information, contact the Director, 2016 Campus Drive.

Cell Biology

For courses in cell biology, see Biology and Medicine (School)—Graduate (School) Basic Science Courses Open to Undergraduates.

Chemistry (CHM)

Professor Crumbliss, *Chair*; Professor Bonk, *Director of Undergraduate Studies and Supervisor of Freshman Instruction*; Professors Baldwin, Chesnut, Fraser-Reid, Lochmüller, McGown, McPhail, Palmer, Porter, Shaw, Smith, and Wells; Associate Professors Henkens, MacPhail, and Pirrung; Assistant Professors Burk, Coury, Prisant, Toone, and Yang; Professors Emeriti Arnett, Bradsher, Brown, Hobbs, Poirier, Quin, Strobel, and Wilder; Adjunct Professors Ghirardelli and Spielvogel; Adjunct Associate Professors Chao and Sternbach; Adjunct Assistant Professor Andrews

A major is available in this department.

Courses with laboratories include fifty to sixty hours of laboratory work per term.

11L, 12L. Principles of Chemistry. (NS) The introductory course for students who intend to take additional chemistry courses other than Chemistry 83. 11L: emphasizes stoichiometry and atomic and molecular structures. 12L: emphasizes thermodynamics, chemical kinetics, synthesis, and analysis. Laboratory work includes both qualitative and quantitative analysis. Prerequisites: one year of high school chemistry or consent of

instructor; Mathematics 19 or its equivalent; and for 12L: Chemistry 11L. One course each. *Bonk and staff*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

83. Chemistry and Society. (NS) For students not majoring in a natural science or continuing in chemistry, but wishing to develop a greater appreciation for chemistry as a key for understanding the observable material world and to gain a background for decisions on societal problems resulting from the impact of chemistry on the environment in the late twentieth century. No previous science background is assumed. Not open to students having credit for Chemistry 11L or equivalent. One course. *Staff*

117. Inorganic Chemistry. (NS) Bonding, structures, and reactions of inorganic compounds studied through physical chemical concepts. Prerequisite: Chemistry 161 or 162L. One course. *Burk, Crumbliss, Palmer, or Wells*

117L. Inorganic Chemistry. (NS) See Chemistry 117. Includes laboratory. One course. *Burk, Crumbliss, Palmer, or Wells*

131. Analytical Chemistry. (NS) Fundamentals of qualitative and quantitative measurement with emphasis on chemometrics, quantitative spectrometry, electrochemical methods, and common separation techniques. Corequisite: Chemistry 133L. Prerequisite: Chemistry 163L. One course. *Coury, Lochmüller, or McGown*

133L. Analytical Chemistry Laboratory. (NS) Laboratory experiments designed to accompany Chemistry 131. Corequisite: Chemistry 131. Half course. *Staff*

151L, 152L. Organic Chemistry. (NS) The structures and reactions of the compounds of carbon. Laboratory: techniques of separation, organic reactions and preparations, and systematic identification of compounds by their spectral and chemical properties. Prerequisite: Chemistry 12L, 23L, or 31S or consent of director of undergraduate studies; for 152L: Chemistry 151L. One course each. *Baldwin, Fraser-Reid, Pirrung, Porter, or Toone*

154L. Intermediate Organic Chemistry: Mechanism and Stereochemistry of Synthetic Organic Reactions. (NS) A mechanism-based survey of enolate chemistry, sigmatropic rearrangements, polyene cyclizations, hydroboration, oxidation and reduction methods. Laboratory work emphasizes techniques involved in manipulation of sensitive reagents and analysis of reaction products. Prerequisite: Chemistry 152L. One course. *Pirrung*

161. Physical Chemistry. (NS) Fundamentals of theoretical chemistry with particular emphasis on chemical thermodynamics and kinetics. Chemistry 163L should be taken concurrently. Prerequisites: Chemistry 12L, Mathematics 32, and Physics 52L or 54L. One course. *Chesnut, Henkens, MacPhail, McPhail, Prisant, Smith, or Yang*

162L. Physical Chemistry. (NS) Fundamentals of theoretical chemistry with particular emphasis on quantum chemistry, molecular structure, and molecular spectroscopy. Laboratory. Prerequisite: Chemistry 12L, Physics 52L or 54L, Mathematics 103 or consent of instructor. One course. *Chesnut, Henkens, MacPhail, McPhail, Prisant, Smith, or Yang*

163L. Physical Chemistry Laboratory. (NS) Laboratory experiments designed to accompany Chemistry 161. Prerequisite: (or corequisite) Chemistry 161. Half course. *Staff*

176. Biophysical Chemistry. (NS) The physical chemical principles of and experimental methods employed in the study of biological macromolecules. Students may not receive credit for both Chemistry 176 and 196S. Prerequisite: Chemistry 161 or Biochemistry 227. One course. *Henkens*

191, 192. Independent Study. Supervised reading and research. Half or one course. Consent of instructor required. Variable credit. *Staff*

193, 194. Independent Study. Supervised reading and research. Prerequisites: Chemistry 191, 192, and consent of independent study coordinator. One course each. *Staff*

195S, 198S. Seminar. (NS) Topics from various areas of chemistry, changing each year. For example: organic chemistry of biologically important compounds, chemical basis of pharmacology, metal ions in biological systems. Open to senior chemistry majors or by consent of instructor. One course each. *Staff*

196S. Seminar. (NS) Selected topics in physical chemistry of biological macromolecules. Students may not receive credit for both Chemistry 176 and 196S. Prerequisites: Chemistry 163L and 175 or Biochemistry 227. One course. *Henkens or Shaw*

For Seniors and Graduates

201. Molecular Spectroscopy. (NS) Selected spectroscopic methods in the study of molecular structure. Symmetry and group theoretical basis for selection rules, theories of magnetic and optical resonance, and interpretation of spectra; examples from both inorganic and organic chemistry. Three lectures. Open to especially well-prepared undergraduates by consent of director of undergraduate studies. One course. *Baldwin, Fraser-Reid, Palmer, Pirrung, Prisant, and Smith*

203. Quantum Chemistry. (NS) Basic principles of quantum and group theoretical methods. Topics include symmetry and a review of the fundamentals and the mathematical foundations of quantum theory. Emphasis on the application of molecular orbital theory to organic and inorganic systems. Open to especially well-prepared undergraduates by consent of director of undergraduate studies. Prerequisite: Chemistry 162L. One course. *Chesnut, MacPhail, and Porter*

205. Structure and Reaction Dynamics. (NS) Structure and mechanisms in organic and inorganic compounds, substitution reactions, linear free energy relations, and molecular rearrangements. Emphasis on the use of kinetic techniques to solve problems in reaction mechanisms. Three lectures. Open to especially well-prepared undergraduates by consent of director of undergraduate studies. One course. *Crumbliss, Porter, Toone, and Wells*

207. Principles of Kinetics, Thermodynamics, and Diffraction. (NS) Three lectures. Open to especially well-prepared undergraduates by consent of director of undergraduate studies. One course. *McPhail, Prisant, Smith, and Yang*

209. Advanced Chemistry. (NS) A combination of three one-third course segments from Chemistry 201, 203, 205, and 207. Interested students should consult the Director of Undergraduate Studies for scheduling. Consent of director of undergraduate studies required. One course. *Staff*

275, 276. Advanced Studies. (NS) (1) Analytical chemistry, (2) inorganic chemistry, (3) organic chemistry, and (4) physical chemistry. Open to especially well-prepared undergraduates by consent of director of undergraduate studies. One course each. *Staff*

COURSES CURRENTLY UNSCHEDULED

23L. Advanced General Chemistry. (NS)

31S. Advanced Chemical Fundamentals. (NS)

151M, 152M. Organic Chemistry. (NS)

175. Molecular Basis of Biological Processes. (NS)

197S. Seminar. (NS)

THE MAJOR

Differing major programs are offered under the baccalaureate degrees, including a new concentration in the area of biochemistry. The Bachelor of Arts degree programs permit greater flexibility in allowing students to select an area of concentration while satisfying the junior-senior small group learning experience requirements through seminar courses (option one) or through independent study in chemistry or related departments (option two). Of particular significance are the areas of emphasis (option three) including biology, mathematics, physics, materials science, and chemical engineering. The Bachelor of Science degree program, accredited by the American Chemical Society, provides in-depth preparation for graduate study in chemistry.

For the A.B. Degree

Prerequisites. Chemistry 11L, 12L; or Chemistry 23L or 31S; or advanced placement. Mathematics 31, 32 (or 31L, 32L or 33, 34); Physics 51L, 52L (or 53L, 54L).

Major Requirements. Chemistry 131, 133L, 151L, 152L, and either 162L or 161 and 163L, *plus* one of the following options:

1. Two of the following: Chemistry 117 or 117L, 154L, 162L,* 175 (or Biochemistry 227), 176, 195S, 196S, 198S.
2. One of the following: Chemistry 117 or 117L, 154L, 162L,* 175 or Biochemistry 227; *plus* Chemistry 191, 192 or the equivalent in a natural science, mathematics, engineering, or a basic science department in the School of Medicine.
3. One of the following:
 - a. Physics emphasis. Chemistry 162L* *plus* two of the following: Physics 143L, Physics 181, Physics 182.
 - b. Mathematics emphasis. Chemistry 162L* *plus* two of the following: Mathematics 104, Mathematics 111, Mathematics 114L, Mathematics 131.
 - c. Biology emphasis. Biochemistry 227 *plus* two of the following: Biology 151, Biology 152, Biology 160, Biology 184L, Biology 244.
 - d. Materials science emphasis. One of the following: Chemistry 117 or 117L; 154L, 162L,* Biochemistry 227; *plus* Engineering 83; *plus* one of the following: Engineering 101, Mechanical Engineering 113, Mechanical Engineering 208.
 - e. Chemical engineering emphasis. One of the following: Chemistry 117 or 117L; 154L, 162L,* Biochemistry 227; *plus* Engineering 75; *plus* one of the following: Engineering 123, Mechanical Engineering 126.

In certain cases, substitutions may be made for courses outside the chemistry department with consent of the director of undergraduate studies.

Recommendations. Computer Science 8 or Engineering 51, Mathematics 103 (for options one and two), and Chemistry 162L. Students planning graduate study are advised to take these recommended courses and to consult with advisors regarding appropriate additional courses.

*If Chemistry 162L is taken to fulfill the major requirement for physical chemistry, then 161/163L must be taken to fulfill the physical chemistry requirement of this option.

For the B.S. Degree

Prerequisites. Chemistry 11L, 12L; or Chemistry 23L or 31S; or advanced placement. Mathematics 31, 32 (or 31L, 32L or 41); 103; and Physics 51L, 52L (or 53L, 54L).

Major Requirements. Chemistry 117L, 131, 133L, 151L, 152L, 161, 162L, 163L, *plus* three or four additional courses selected according to option 1, 2, or 3.

1. Three chemistry courses selected as follows.
At least 2 of the following: Chemistry 154L, 191 or 192.
Plus: Chemistry 176, 195S, 196S, 198S, 201, 203, 205, 207, 209, 275 or 276.
2. Two chemistry courses plus one approved course in another department selected as follows.
At least 1 of the following: Chemistry 154L, 191 or 192.
Plus: Chemistry 176, 195S, 196S, 198S, 201, 203, 205, 207, 209, 275 or 276.
Plus: One lecture course in an approved science department in Trinity College, basic science of the School of Medicine, or in the School of Engineering.
3. Two chemistry courses plus two independent study courses in an approved department selected as follows.
At least two of the following: Chemistry 154L, 176, 191, 195S, 196S, 198S, 201, 203, 205, 207, 209, 275 or 276.
Plus: Two approved independent study courses in a science department in Trinity College, basic sciences of the School of Medicine, or in the School of Engineering.

Chemistry 201, 203, 205, and 207 are offered also in one-third semester segments; in some instances a student may wish to take some combination of three of these segments by registering for Chemistry 209. Additional details may be obtained from the Director of Undergraduate Studies.

Recommendations. Mathematics 104 and Physics 100. Students planning graduate study in chemistry should consult with advisors regarding appropriate additional courses.

The Concentration in Biochemistry

In cooperation with the Department of Biochemistry in the School of Medicine, the Chemistry Department offers both an A.B. and a B.S. degree in chemistry with concentration in biochemistry. Certification of this concentration is designated on the official transcript.

For the A.B. Degree with Concentration in Biochemistry

Prerequisite: Chemistry 11L, 12L (or 23L or 31S or advanced placement); Mathematics 31, 32 (or 31L, 32L or 41); Physics 51L, 52L (or 53L, 54L); and Biology 21L, 22L.

Major Requirements. Chemistry 131/133L, 151L, 152L, 161/163L; Biochemistry 227, 228; *plus* one of the following: Chemistry 176, 191, 195S, 198S; Biology 160, 180, 184L, 191; or any advanced course in biochemistry.

For the B.S. Degree with Concentration in Biochemistry

Prerequisites. Chemistry 11L, 12L (or 23L or 31S or advanced placement); Mathematics 31, 32 (or 31L, 32L or 41); Physics 51L, 52L (or 53L, 54L); and Biology 21L, 22L.

Major Requirements. Chemistry 117L, 131/133L, 151L, 152L, 161/163L, either 176 or 162L; Biochemistry 227, 228; Biology 160 or 180, *plus* one of the following: Chemistry 191, Biology 191, or Biochemistry 209.

Recommendations. Chemistry 192, 195S, 198S; Biology 184L, 192; advanced courses in biochemistry.

Honors/Distinction

The department offers a program for graduation with distinction in chemistry. See the section on honors in this bulletin. The program involves two semesters of independent study, taken either in the chemistry department (Chemistry 191, 192) or, with the prior approval of the coordinator of independent study, in an appropriate science department in Trinity College, the School of Engineering, or the School of Medicine. A research paper based upon the independent study and nomination by the research supervisor form the basis for consideration by a departmental committee. The committee may recommend the student for graduation with distinction in chemistry. The department also offers Latin honors by honors project. Additional details may be obtained from the director of undergraduate studies.

Chinese

For courses in Chinese, see Asian and African Languages and Literature.

Classical Studies (CS)

Professor Clay, *Chair*; Associate Professor Burian, *Director of Undergraduate Studies*; Professors Connor, Newton, Oates, and Younger; Associate Professors Boatwright, Rigsby, and Stanley; Assistant Professor Janan; Professors Emeriti Richardson and Willis; Senior Lecturing Fellow Zarker

Majors are available in this department.

The objective of classical studies is to increase knowledge and understanding of the roots of Western culture in the civilizations of Greece and Rome. Toward this aim, the department offers courses in three areas (Latin, Greek, and classical studies) and two majors (classical studies, classical languages). Concentration in the languages offers students training in exploring at first hand the literature, history, and thought of antiquity. In the process, students will gain a deeper insight into language itself, as well as an appreciation of the problems of interpretation and the varieties of evidence upon which interpretation may be based. For students interested in history, ancient art, or archaeology, courses in classical studies offer a means of assessing the culture and the material remains of Greece and Rome in their own rich and varied context.

A secondary aim is, and has been by a centuries-old tradition, the development of a keener perception and understanding of the cultural forces at work in the contemporary world. As a result, the field of classical studies is an excellent foundation for advanced work in other academic disciplines as well as in professional programs in law, medicine, and finance.

GREEK (GRK)

1-2. Elementary Greek. (FL) A study of grammar and an introduction to reading. Two courses. *Staff*

14S. Intensive Elementary Greek. (FL) Introduction to the grammar, offered only in the summer; combining the work of Greek 1 and 2 in one course. Two courses. *Staff*

15S. Intensive Intermediate Greek. (FL) Combining the work of Greek 63 and 64 in one course, offered only in the summer; selected readings in prose and poetry. Two courses. *Staff*

63, 64. Intermediate Greek. (FL) Introduction to Greek prose and poetry. 63: Plato's *Republic*, *Apology*, or *Symposium*. 64: Euripides and Homer. One course each. *Burian or Clay*

103S, 104S. Studies in Greek Literature. (AL, FL) 103S: Herodotus and Sophocles. 104S: Thucydides and Aristophanes. One course each. *Burian, Clay, or Oates*

200. **Readings in Greek Literature.** (AL, FL) One course. *Staff*

203. **Homer.** (AL, FL) Problems of language and structure in the *Iliad*; present state of Homeric scholarship. One course. *Stanley*

205. **Greek Lyric Poets.** (AL, FL) Fragments of the early lyric poets; selected odes of Pindar and Bacchylides. One course. *Burian or Stanley*

207. **The Dramatists.** (AL, FL) Readings and studies of selected plays by the major playwrights Aeschylus, Sophocles, Euripides, and Aristophanes. One course. *Burian*

210. **Alexandrian Poetry.** (AL, FL) Emphasis on the *Argonautica* of Apollonius of Rhodes, and attention to the shorter poems of Theocritus and Callimachus. One course. *Stanley*

222. **The Historians.** (AL, FL) Readings and studies in the major Greek historians Herodotus, Thucydides, and Xenophon. One course. *Oates*

226. **The Orators.** (AL, FL) Selections from the principal Attic orators, with emphasis on Lysias and Demosthenes. One course. *Connor*

Courses offered each year on demand in consultation with the Director of Undergraduate Studies:

191, 192. **Independent Study.** Directed reading and research. Open only to qualified juniors and seniors. Half or one course. Variable credit. *Staff*

193, 194. **Honors Research in Greek.** Research culminating in the writing of one longer or two shorter papers as partial fulfillment of the requirements for graduation with distinction. Open only to senior majors. One course each. *Staff*

217T. **Greek Prose Composition.** (FL) The course content is determined by the needs of the students enrolled. One course. *Staff*

Courses Currently Unscheduled

209. **Introduction to Hellenistic Literature.** (AL, FL)

LATIN (LAT)

1-2. **Elementary Latin.** (FL) Study of the structure of the language (forms, vocabulary, syntax, and pronunciation); selected readings in prose and poetry. Two courses. *Stanley*

14S. **Intensive Elementary Latin.** (FL) Introduction to the grammar, offered only in the summer; combining the work of Latin 1 and 2 in one course. Two courses. *Staff*

15S. **Intensive Intermediate Latin.** (FL) Combining the work of Latin 63 and 64 in one course, offered only in the summer; selected readings in prose and poetry. Two courses. *Staff*

63, 64. **Intermediate Latin.** (FL) Introduction to Latin prose and poetry. 63: selected prose, including Caesar. 64: three books of Vergil's *Aeneid*. One course each. *Rigsby or Zarker*

100. **Introduction to Literature.** This number represents course credit for a score of 4 or 5 on one or more of the College Board Advanced Placement tests in Latin. One course.

101. **Advanced Latin.** (AL, FL) Transition course for freshmen and sophomores from high school to college Latin. Review of grammar; readings in prose and poetry. Prereq-

uisites: achievement score of 640 and above, or a College Board Advanced Placement score of 4 or 5 in Latin. One course. *Clay*

103S, 104S. Studies in Latin Literature. (AL, FL) 103S: the Late Republic, including Catullus and Cicero. 104S: the Age of Augustus, including Horace and Livy. One course each. *Janan or Stanley*

105S. Ovid: *The Metamorphoses*. (AL, FL) The poem studied as representative of Ovid's varied narrative art, as the largest-scale Roman treatment of classical myths, and as Ovid's statement on Augustanism. One course. *Janan or Newton*

107S. Vergil's *Aeneid*. (AL, FL) Reading and analysis of the *Aeneid*, with particular attention to stylistics and historical setting. One course. *Newton*

108S. Lyric and Occasional Poetry. (AL, FL) Readings in the works of Catullus, Horace, and Martial. One course. *Janan or Newton*

111S. Elegiac Poets. (AL, FL) The traditions of Latin love elegy and its development in Propertius, Tibullus, and Ovid. One course. *Janan*

112S. Roman Comedy. (AL, FL) Representative plays of Plautus and Terence with lectures on the genre and its Greek forebears. One course. *Richardson*

116S. Lucretius. (AL, FL) The *De Rerum Natura* studied as poetry and philosophical thought. One course. *Clay or Newton*

170. Special Topics in Latin Literature. (AL, FL) Prerequisite: Latin 64 or 104S, depending on the topic. One course. *Staff*

200. Readings in Latin Literature. (AL, FL) One course. *Staff*

205. The Roman Novel. (AL, FL) Readings in Petronius and Apuleius. One course. *Richardson*

206S. Cicero. (AL, FL) One course. *Richardson*

207S. Vergil's *Aeneid*. (AL, FL) Intensive analysis of all of Vergil's *Aeneid*, focusing on text and historical context, complemented by research papers and reports. Not open to students who have taken Latin 107S. One course. *Newton*

208S. Lyric and Occasional Poetry. (AL, FL) Readings in the works of Catullus, Horace, and Martial. Same as 108S, except additional term paper required. One course. *Janan or Newton*

211S. Elegiac Poets. (AL, FL) Analysis of most of the *corpora* of Propertius, Tibullus, and Ovid with close attention to the stylistics of the poems, their place in the traditions of Latin love elegy, and their relation to other phenomena of the Augustan period. Not open to students who have taken Latin 111S. One course. *Janan or Richardson*

214S. The Historians. (AL, FL) Investigations of the Romans' conceptions and practices of writing history, based on detailed analysis of the works of Sallust, Livy, and Tacitus. Additional readings in the fragments of other Latin historians, and in comparative Greek historians. Not open to students who have taken Latin 114S. One course. *Boatwright or Richardson*

221. Medieval Latin. (AL, FL) Selected works of the Latin Middle Ages from Prudentius to the humanists. Genres studied usually include the hymn, sequence, drama, lyric, saints' lives, chronicle, epic, and epistle. C-L: Medieval and Renaissance Studies. One course. *Newton*

Courses offered each year on demand in consultation with the director of undergraduate studies.

191, 192. Independent Study. Directed reading and research. Open to qualified juniors and seniors. Half or one course. Variable credit. *Staff*

193, 194. Honors Research in Latin. Research culminating in the writing of one longer or two shorter papers as partial fulfillment of the requirements for graduation with distinction. Open only to senior majors. One course each. *Staff*

217T. Latin Prose Composition. (FL) The course content is determined by the needs of the students enrolled. One course. *Staff*

Courses Currently Unscheduled

106S. Roman Satire. (AL, FL)

204. Epic of the Silver Age. (AL, FL)

CLASSICAL STUDIES (CS)

11S. Greek Civilization. (CZ) The culture of the ancient Greeks from the Bronze Age to Alexander the Great: art, literature, history, philosophy, and religion. One course. *Staff*

12S. Roman Civilization. (CZ) The culture of ancient Romans from their beginnings to Constantine: art, literature, history, philosophy, and religion. One course. *Staff*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

53. Greek History. (CZ) The political and intellectual history of the Hellenes from earliest times to the death of Alexander the Great. C-L: History 53. One course. *Oates*

54. Roman History. (CZ) The Roman Republic and Empire to the Late Antique. C-L: History 54. One course. *Oates*

63. The Epic. (AL) Reading in translation of major epics from antiquity and the Middle Ages, such as *Gilgamesh*, Homer's *Iliad* and *Odyssey*, Vergil's *Aeneid*, and *Beowulf*. One course. *Burian or Clay*

64. Drama of Greece and Rome. (AL) Reading in translation of Greek and Roman tragedies (Aeschylus, Sophocles, Euripides, Seneca) and comedies (Aristophanes, Menander, Plautus, Terence). C-L: Drama 64. One course. *Burian*

95. Principles of Archaeology. (CZ) Introduction to the many disciplines of archaeology, including a history of the subject, excavation techniques, surveying, creating stylistic typologies, mechanical drawing, and the interpretation of archaeological evidence. One course. *Younger*

99. Perspectives in Archaeology. (CZ) See C-L: Religion 99; also C-L: Interdisciplinary Course 99 and Judaic Studies. One course. *C. Meyers, E. Meyers, Younger, and staff*

100. History of Ancient Philosophy. (CZ) Not open to students who have taken Classical Studies 93 or Philosophy 93. Prerequisites: for first-year students, previous philosophy course and consent of instructor. See C-L: Philosophy 100. One course. *Ferejohn or Mahoney*

104S. Women in the Ancient World. (CZ) The perception and reality of the roles, functions, and status of women from the time of Homer to late antiquity. C-L: History 126S and Women's Studies. One course. *Boatwright*

113. Aristotle. (CZ) See C-L: Philosophy 123. One course. *Ferejohn*

115. The Classical Tradition. (AL) The notion of the "classical" from the creation of the archetype to the present. One course. *Burian*

117. Ancient Myth in Literature. (AL) Myth in classical and medieval writers from Hesiod to Boccaccio. C-L: Medieval and Renaissance Studies. One course. *Newton*

123. Greek Art and Archaeology I. (AL) Greek architecture, sculpture, and painting from the Bronze Age through the Classical period. C-L: Art 123. One course. *Younger*

124. Greek Art and Archaeology II. (AL) Architecture, sculpture, painting, and mosaics from the Classical period through the Greco-Roman period. C-L: Art 124. One course. *Younger*

128. Art of the Roman Empire. (AL) See C-L: Art 128. One course. *Staff*

130. Late Antique Christian Art. (AL) See C-L: Art 130; also C-L: Religion 130. One course. *Wharton*

131. Art of the Early Middle Ages. (AL) See C-L: Art 131; also C-L: Medieval and Renaissance Studies. One course. *Tronzo or Wharton*

139. Aspects of Medieval Culture. (CZ) See C-L: Medieval and Renaissance Studies 114; also C-L: Art 139 and History 116. One course. *Solterer, Tronzo, and Witt*

145. Rome: History of the City. (CZ) The development of the urban plan and its major monuments through the ages; the influence of the ancient Republic and Empire, the Papacy, and the modern secular state; change and continuity in artistic forms and daily life. (Taught on site in Italy in summer.) C-L: Art 126. One course. *Staff*

147. Ancient Greece. (CZ) On-site study of the cultures in Greece from Neolithic to Medieval, concentrating on Athens, the Peloponnese, Crete, and the Cyclades. Summer program in Greece. Prerequisite: Classical Studies 115, 53, 123, or 124, or History 53, or consent of instructor. C-L: Art 115. One course. *Younger*

195S, 196S. Junior-Senior Seminars in Classical Studies. (CZ) Specific aspects of the history, art, and literature of classical Greece and Rome. Open only to qualified juniors and seniors; some knowledge of classical studies and history desirable, but not strictly necessary. One course each. *Staff*

203. Ancient Political Philosophy. (SS) See C-L: Political Science 223. One course. *Gillespie or Grant*

211S. Plato. (CZ) Selected dialogues. C-L: Philosophy 211S. One course. *Ferejohn*

217S. Aristotle. (CZ) Selected topics. C-L: Philosophy 217S. One course. *Ferejohn*

220S. Topics in Greek Art. (AL) Consent of instructor required. See C-L: Art 201S. One course. *Staff*

221. Archaic Greece. (CZ) Greece and the Near East from the end of the Bronze Age to the Persian Wars. C-L: History 259. One course. *Oates or Rigsby*

222. Fifth and Fourth Century Greece. (CZ) From the Persian Wars to the dominance of Philip of Macedon. C-L: History 260. One course. *Oates or Rigsby*

224. The Roman Republic. (CZ) The rise of Rome, to its mastery of the Mediterranean; the political, social, and intellectual consequences. C-L: History 263. One course. *Boatwright or Rigsby*

227S. Topics in Roman Art. (AL) Consent of instructor required. See C-L: Art 202S. One course. *Staff*

230S. Topics in Early Christian and Byzantine Art. (AL) Consent of instructor required. See C-L: Art 233S; also C-L: Medieval and Renaissance Studies and Religion 275S. One course. *Wharton*

231S. Greek Sculpture. (AL) Free standing, relief, and architectural sculpture from the archaic period to the Hellenistic age, representing changing aesthetic, social, and political aims. C-L: Art 238S. One course. *Younger*

232S. Greek Painting. (AL) From the Late Bronze Age to the fourth century B.C., with emphasis on archaic and classical Athenian vase painters. C-L: Art 237S. One course. *Stanley*

258. The Hellenistic and Roman East. (CZ) The social and cultural history of the Greco-Roman world, concentrating on papyrological evidence. Prerequisites: knowledge of ancient Greek and Latin. One course. *Oates*

Courses offered each year on demand in consultation with the director of undergraduate studies.

191, 192. Independent Study. Directed reading and research. Open only to qualified juniors and seniors. One course each. *Staff*

193, 194. Honors Research in Classical Studies. Research culminating in the writing of one longer or two shorter papers as partial fulfillment of the requirements for graduation with distinction. Open only to senior majors. One course each. *Staff*

Courses Currently Unscheduled

70. The Age of Augustus. (CZ)

101. Science and Technology in the Ancient World. (CZ)

102. History of Greek and Roman Civil Law. (CZ)

103. Religion in Greece and Rome. (CZ)

114D. Hellenistic Philosophy. (CZ)

129. The Age of Justinian. (AL)

135. Alexander the Great. (CZ)

137-138. Roman and Non-Roman in Ancient Italy. (CZ)

155. The Aegean Bronze Age. (CZ)

161S. Athens. (CZ)

162. Pompeii. (CZ)

171. Ancient Cosmology. (CZ)

223. Alexander and the Hellenistic World. (CZ)

225. The Roman Empire. (CZ)

226. Late Antiquity. (CZ)

233S. Greek Architecture. (AL)

235S. Roman Architecture. (AL)

236S. Roman Painting. (AL)

THE MAJOR

Students may choose first or second majors in classical studies (ancient history, archaeology, literature in translation or in the original) or in classical languages (a third-year reading level in either Latin or Greek and a second-year reading level in the other ancient language, with additional course work in classical civilization).

Students who contemplate graduate work in classical studies or in the ancient languages Greek and Latin are reminded of the necessity for competence in both these languages (usually at least three years of the one and two of the other) and an eventual reading knowledge of French and German for all higher degrees.

Prospective majors in classical languages are urged to consult with the director of undergraduate studies at the earliest feasible time, preferably by the sophomore year.

Majors are eligible for nomination to one semester during their junior year at the Intercollegiate Center for Classical Studies in Rome, of which Duke University is a founding member, or at the College Year in Athens, at a cost comparable to that of a semester at Duke. Financial assistance at Duke can usually be transferred, and arrangements are made through the university. Courses in Greek, Latin, ancient history, and archaeology taken in these programs are counted toward the major requirements. For further information, see the section on study abroad.

Classical Studies (Literature, Ancient History, Civilization, or Archaeology)

Prerequisites. Classical Studies 11S or 53, and Classical Studies 12S or 54.

Major Requirements. Seven classical studies courses above the level of Classical Studies 60, including Classical Studies 195S or 196S; at least two courses must be in separate areas (literature in translation or above the level of Greek/Latin 64; history, or art and archaeology).

Related Work. The department urges all classical studies majors to fulfill the university foreign language area of knowledge.

Classical Languages (Greek and Latin)

Major Requirements. Both ancient languages, Greek and Latin, one to a full third-year reading level (the equivalent of Greek or Latin 104), and at least four college courses in the other (at least the equivalent of Greek or Latin 64). And two classical studies courses, including Classical Studies 195S or 196S, in separate areas (literature in translation; history, or art and archaeology).

Related Work. The department urges all classical languages majors to acquire some reading knowledge of French and German.

Honors/Distinction

The department offers work leading to graduation with distinction and to graduation with Latin honors by honors project. See the section on honors in this bulletin and the departmental Director of Undergraduate Studies.

Comparative Area Studies Program (CST)

Professor Lawrence, *Director*

A major is available in this program.

The undergraduate major in comparative area studies offers a Bachelor of Arts degree to students interested in the interdisciplinary study of societies and cultures of a particular region of the world. Students complement their study with a concentration in a second world area and the comparative study of international themes or problems. The major allows a student to combine language study with courses in a variety of disciplines. As in area studies programs elsewhere, the result is a sustained focus on a single world area tailored to fit the student's interest. Comparative area studies at Duke,

however, is distinct from other area studies programs in several respects. The primary concentration encourages study of language, literature, religion, and art of the chosen area as well as analysis of its social, historical, and political roots and problems. The secondary concentration imparts breadth of focus and a cross-regional perspective to the course of study, while the required course on comparative methods ensures an analytic perspective that is multidisciplinary as well as global.

Students in the program are currently studying Latin America, North America, Africa, the Middle East, Russia, South Asia, East Asia, and Eastern and Western Europe. Many comparative area studies majors double-major in comparative area studies and in such fields as art history, cultural anthropology, history, political science, Spanish, and French. Although the program provides all students with a solid background in liberal arts, it is specifically designed for those with career objectives in academia, government (especially the Foreign Service), international business, international law, health and environmental programs, the United Nations and international agencies and private international religious or service organizations.

The major draws its offerings from courses taught by over 130 Duke professors in fourteen cooperating departments. Interdisciplinary and intercultural courses have been designed specifically for majors in the program to help place those societies chosen for specialization in a broad comparative and global perspective. These courses stress the interrelationship of developed and underdeveloped societies and probe the difficulties and advantages of comparative, interdisciplinary, and intercultural research. The program is administered by its director and an advisory committee representing the various areas and cooperating departments.

Advising: Students must identify the area of their primary concentration. Faculty members with expertise in each area are available to provide advice concerning selection of an area and appropriate course work in the major. Selection of area is normally done by the end of the sophomore year. The program tries to foster close relationships between faculty and students working in similar areas.

Study Abroad or on Another Campus: The program encourages qualified and interested students to engage in sustained study abroad in their chosen area for a semester or for an academic year. Up to three courses taken in a non-Duke semester abroad program may be counted toward the requirements in the major. Duke students are eligible for a variety of programs now operating in Africa, Asia, Canada, Latin America, Russia, and Eastern and Western Europe. Students can also take advantage of a special service study in Washington, and internship programs with international agencies. Occasionally summer internships become available for qualified students.

Grants and Awards: At the initiative of the Center for International Studies, a program of grants and awards for majors has been instituted. A competition is held in the fall to select a small group of upperclass majors to organize a scholarly symposium on a comparative/global issue during the spring semester. Summer stipends for travel and research abroad are also offered to selected rising senior majors planning to enroll in the honors seminar. The author of the best research paper submitted to the honors seminar is recognized by an award for excellence in comparative analysis.

The courses listed on the following pages meet requirements for the major as introductory courses, area courses, and comparative/global issue courses. Basic language courses and courses at the 100 and 200 level taught in the foreign language satisfy the foreign language corequisite; such courses are not listed. Only advanced language and literature courses meeting requirements for specific areas of the major are listed below. Selected non-listed upper level and seminar courses offered by various departments and programs (including Comparative Area Studies 140 and Comparative Area Studies 200S), the topics of which vary from semester to semester, may also be included if the topics covered fall within a particular area or focus on comparative/global issues. To determine if specific courses meet requirements for the major, consult the director. To meet the general studies requirement of Program I, courses in the major from only

two areas of knowledge may be counted. For a complete description of each course, including cross-listings, consult the listing in the Duke University bulletin under the appropriate department or under Interdisciplinary Courses.

COMPARATIVE AREA STUDIES COURSES

109. Contemporary Global Issues. (SS) Nature of important global phenomena and conditions and their manifestations in diverse regions and societies. Includes such questions as what is progress? Are nation-states obsolete? How are we managing an interdependent world economy and a fragile global environment? C-L: Cultural Anthropology 109, History 109, Political Science 160, and Sociology 175. One course. *Staff*

110. Global Human Geography. (SS) World development and modernization through the lenses of geography. Patterns of adaptation by peoples and societies to different physical environments and the changing world economy. One course. *Staff*

125. Strategies of Comparative Analysis. (SS) Comparative research and analysis in the social sciences and the humanities: strengths and weaknesses of cross-cultural comparison as developed by sociologists, historians, political scientists, anthropologists, and specialists in comparative literature and religion. C-L: Cultural Anthropology 125, History 137, Political Science 125, Religion 121, and Sociology 125. One course. *Staff*

140. Selected Topics in Comparative Area Studies. Topics vary from semester to semester, focusing either on specific world regions or particular comparative/global issues. One course. *Staff*

150S. Comparative Area Studies Honors Seminar. (CZ) Open to seniors majoring in Comparative Area Studies. Consent of instructor required. One course. *Staff*

200S. Advanced Topics in Comparative Area Studies. Topics vary, focusing either on specific world regions or particular comparative/global issues. One course. *Staff*

INTRODUCTORY COURSES

Comparative Area Studies 109. Contemporary Global Issues. *Staff*
Comparative Area Studies 110. Global Human Geography. *Staff*
Cultural Anthropology 94. Introduction to Cultural Anthropology. *Staff*
History 75, 76. The Third World and the West. *Ewald, Gordon, or Little*
Literature 101. Introduction to the Study of Literature and Society. *Willis*
Music 136S. Introduction to World Music. *Staff*
Political Science 92. Comparative Politics. *Staff*
Religion 45. Religions of Asia. *Cornell or Lawrence*

COMPARATIVE/GLOBAL ISSUES COURSES

Art and Art History

168. Art since 1945. *Cernuschi or Stiles*
169. Documentary Photography and Social Activism. *Stiles*
177. The History of Conceptual Art. *Stiles*
179. The History of Performance Art. *Stiles*
244 A.S. International Expressionism. *Cernuschi and Rolleston*

Asian and African Languages and Literature

121. Introduction to Asian and African Literature. *Staff*

Cultural Anthropology

100. Foundations of Cultural Anthropology. *Staff*
114. Gender Inequality. *Quinn or Starn*
116. Language, Ethnicity, and New Nations. *Staff*
119. Language, Culture, and Society. *Apte, O'Barr, or Strauss*
126. Muslim World: Transformations and Continuities. *Ewing*
161. Anthropological Approaches to Religion. *Ewing*
257S. Food in Cross-Cultural Perspectives. *Apte*

Economics

- 140. Comparative Economic Systems. *Staff*
- 219S. Economic Problems of Underdeveloped Areas. *Kelley or Wallace*
- 240. Comparative Economic Systems. *Trembl*
- 286S. Economic Policy-Making in Developing Countries. *Conrad or Ramachandran*

History

- 101C. Terrorism, 1848-1968. *M. Miller*
- 112A. The World in the Twentieth Century, 1900-1945. *Cell*
- 112B. The World in the Twentieth Century, 1945 to the Present. *Cell*
- 114B. Immigration, Migration, and Mobility of Labor. *Keyssar*
- 120. History of Socialism and Communism. *Lerner*
- 123S. Madness and Society in Historical Perspective. *M. Miller*
- 128. Comparative Social Movements. *Goodwyn*
- 132. Modern World Environmental History, 1500 to the Present. *Richards*
- 158A. New Perspectives on the Atlantic World. *Ewald*
- 167S. United States and Canadian Constitutional Issues. *Cahow*
- 168S. The Atlantic Slave Trade. *Gaspar*
- 195S.18. The Destruction and Aftermath of Slavery in the Americas: A Comparative Perspective. *J. Scott*
- 195S.36. Women, Family, and State. *Y. Miller*
- 195S.40. Fugitive Slave (Maroon) Communities in New World Slave Societies. *Gaspar*
- 195S.45. Canadian and American Agrarian Movements. *Thompson*
- 218. Perspectives on the Atlantic World. *Ewald*
- 225S. Problems in Comparative Labor History. *French, Gordon, or Keyssar*
- 233S. Slave Resistance and Social Control in New World Societies. *Gaspar*
- 239S. History of Socialism and Communism. *Lerner*
- 243, 244. Marxism and Society. *Dirlik*

Interdisciplinary Courses

- 120A. Perspectives on Food and Hunger. *Johns*
- 120B. Perspectives on Food and Hunger. *Johns*

Literature

- 135. National Identity. *Hell, Kaplan, Longino, and Stewart*
- 136. Autobiography across Cultures. *Kaplan or Willis*
- 151. Special Topics in Women Writers of the World. *Staff*
- 152. Special Topics in Regional Literatures of the Western World. *Staff*
- 157. International Popular Culture. *C. Davidson, Gaines, Radway, or Willis*
- 185. Psychoanalysis, Literature, and Film. *Gaines*
- 198. Censorship, Law, and Literature. *Staff*

Political Science

- 100K.01. Anglo-American Constitutionalism, Law, and Legal Institutions. (Taught in England.) *Staff*
- 100L.01. Law and Liability: Personal Injury in Britain and the United States. (Taught in England.) *Staff*
- 100N.02. The United States and Western Europe. (Taught in Brussels.) *Grieco*
- 107. Comparative Environmental Policies. *McKean*
- 147. International Environmental Politics and Policies. *McKean or Miranda*
- 153, 154. Politics and Media of Mass Communication. *Paletz*
- 155. The Politics and Economics of Developing Areas. *Staff*
- 173S. Political Economy of World Food Problems. *Johns*
- 212S. Domestic Structures and Foreign Policies of Advanced Democratic States. *Grieco*
- 231S. Crisis, Choice, and Change in Advanced Democratic States. *Kitschelt*
- 234S. Political Economy of Development: Theories of Change in the Third World. *Staff*
- 235S. Comparative Development of Islam. *Staff*
- 262S. International Communism. *Hough*
- 277. Comparative Party Politics. *Lange*
- 279S. Political Protest and Collective Mobilization. *Kitschelt*

Public Policy Studies

- 179S. Refugees and World Politics. *Boothby*
- 264S.57. Technology and Development. *Ramachandran*
- 266S. Comparative Social Policy. *Smith*
- 284S. Public Policy Process in Developing Countries. *Ascher*
- 286S. Economic Policy-Making in Developing Countries. *Conrad or Ramachandran*

Religion

- 103. Islam on the Pacific Rim. *Cornell*

112. Muslim Minorities in Society: From Asia to America. *Cornell and Lawrence*
 113. Liberation Theologies in Asia, Africa, and Latin America. *Staff*

Russian

155. The Interaction of Russian and American Culture. *Lahusen and Van Tuyl*

Sociology

- 110E. Comparative Sociology: Cross-Regional. *Gereffi*
 118. Sex, Gender, and Society. *O'Rand*
 126. Third World Development. *Gereffi or Parnell*
 142. Organizations and Global Competitiveness. *Gereffi*
 143. Management and Labor Relations. *Gereffi, Janoski, or Thornton*
 170. Mass Communication. *Smith*
 171. Comparative Health Care Systems. *Maddox*
 179. Modern Nationalist Movements. *Tiryakian*
 182. Media in Comparative Perspective. *Smith*
 195S. Process of Globalization. *Tiryakian*
 214. Comparative and Historical Methods. *Archer, Gereffi, Janoski, Lin, Smith, or Tiryakian*
 222S, B. Comparative Aspects of Societal Transformation. *Gereffi, Lin, Simpson, Smith, or Tiryakian*
 222S, D. Special Topics in Historical and Comparative Sociology. *Gereffi, Lin, Simpson, Smith, or Tiryakian*
 227S, C. Proseminar in Medical Sociology: Organizing and Financing Health Care. *George, Gold, Jackson, Lin, Maddox, Thornton, or Weinberger*

AREA COURSES: AFRICA

Art

173. Art, Architecture and Masquerade in Africa. *Powell*
 174. Art and Philosophy from West Africa to the Black Americas. *Powell*

Cultural Anthropology

122. Modern Africa. *O'Barr*

French

168. Francophone Literature. *Mudimbe-Boyi*

History

115. History of Africa. *Ewald*
 168S. The Atlantic Slave Trade. *Gaspar*
 179. History of South Africa, 1600-1960. *Ewald*
 195S.23. Issues in the History of Tropical Africa. *Ewald*

Political Science

- 100C.01. Politics and Literature in Southern Africa. (Taught in Africa.) *Johns*
 100C.02. Issues of Development in Botswana and Zimbabwe. (Taught in Africa.) *Johns*
 171. Politics of South African Apartheid. *Johns*

Religion

164. History and Religions of North Africa. *Cornell*

Sociology

- 110A. Comparative Sociology: Selected Areas (Africa). *Gao, Gereffi, Janoski, Lin, Myers, Smith, or Tiryakian*

AREA COURSES: EAST ASIA

Art

172. Topics in Oriental Art. *Lee*

Asian and African Languages and Literature

- 166S. Chinese Thought from Confucius to Mao. *Mair*

Chinese

129. Advanced Readings in Chinese. *Staff*
 141S. The Fantastic in Chinese Fiction in Translation. *Wang*
 148S. Literature and Revolution: From the May Fourth to the Post-Mao Era. *Wang*
 183, 184. Topics in Modern Chinese. *Wang or Yao*
 Additional Chinese courses are taught in Beijing and Nanjing as part of the Duke Study in China Program.

Cultural Anthropology

163. Foundations of Chinese Civilization. (Taught in China.) *Staff*

Economics

- 134/234. Japanese Economy and Its History. *Bronfenbrenner*
- 142/242. Chinese Economy. *Yang*

History

- 100J. Foundations of Chinese Civilization. (Taught in China.) *Staff*
- 101K. Topics in Chinese Civilization. *Dirlik*
- 101M. Asian-Pacific Region in Historical Perspective. *Dirlik*
- 122B. Japan: Population, Resources, and Development: 1600-1940. *Wigen*
- 142A. China: Roots of Revolution. *Dirlik or Mazumdar*
- 142B. China since 1949: The People's Republic. *Dirlik*
- 143A. Ancient and Early Modern Japan. *Gordon or Wigen*
- 143B. The Emergence of Modern Japan. *Gordon*
- 195S.05. Japanese Women's History. *Wigen*
- 195S.08, 196S.08. Modern Chinese Thought. *Dirlik*
- 195S.17, 196S.17. Problems in the History of Modern Japan. *Gordon*
- 208S. Geographic Perspectives in History II: Asian and Pacific Worlds. *Wigen*
- 245, 246. Social and Intellectual History of China. *Dirlik*

Japanese

- 161. Modern Japanese Fiction in Translation. *Dodd*
- 162. Premodern Japanese Literature. *Dodd*
- 183, 184. Topics in Japanese. *Dodd*

Political Science

- 111. Contemporary Japanese Politics. *McKean*
- 132. Politics of Asia. *Lomperis*
- 133. Japanese Foreign Relations. *McKean*

Religion

- 218. Religions of East Asia. *Corless*

Sociology

- 110B. Comparative Sociology: Asia. *Lin*

AREA COURSES: EASTERN EUROPE

History

- 110. History of Eastern Europe in Modern Times. *Lerner*
- 120. History of Socialism and Communism. *Lerner*
- 195S.10. Jews in Eastern Europe in Modern Times. *Lerner*
- 239S. History of Socialism and Communism. *Lerner*

Polish

- 187. Introduction to Polish Literature. *Lahusen*

Political Science

- 105. The Politics of Democratization in Eastern Europe. *Kitschelt*

Russian

- 163. Literature of the Former Soviet Republics. *Dobrenko*
- 201S,A. Comparative Slavic Linguistics: East Slavic. *Andrews or Pugh*
- 201S,B. Comparative Slavic Linguistics: West Slavic. *Andrews or Pugh*
- 201S,C. Comparative Slavic Linguistics: South Slavic. *Andrews or Pugh*
- 201S,D. Comparative Slavic Linguistics: Common Slavic. *Andrews or Pugh*

AREA COURSES: LATIN AMERICA

Art

- 193. Art and Culture of Mesoamerica. *Reents-Budet*
- 194. Maya Art and Culture. *Reents-Budet*
- 195. Pre-Columbian Art and Culture of Andean South America. *Reents-Budet*
- 257S. Topics in Pre-Columbian Art and Culture. *Reents-Budet*

History

- 104B. A Survey of Latin American History through Film. *TePaske*
- 131A. History of Mexico and the Caribbean in the Nineteenth and Twentieth Centuries. *TePaske*
- 136. Introduction to Contemporary Latin American Reality. *James*
- 173. History of Spain from Late Medieval Times to the Present. *TePaske*
- 174A. History of Colonial Hispanic America from Pre-Columbian Times to the Wars of Independence. *TePaske*

- 174B. Modern Latin America. *Staff*
 195S.22, 196S.22. Problems in Latin-American History. *TePaske*
 196S.29. Proletarians and Peasants, Bandits and Prophets: Social Movements in Nineteenth- and
 Twentieth-Century Latin America. *James*
 230S. Populism in Latin America. *James*
 231S. Readings in Latin American Colonial History. *TePaske*
 265S. Problems in Modern Latin American History. *Staff*

Interdisciplinary Courses

- 198S. Current Topics on Latin America. *Staff*

Political Science

- 100B.01. Authoritarianism and Democracy in Brazil. (Taught in Brazil.) *Staff*
 100B.02. Brazil in World Politics. (Taught in Brazil.) *Staff*
 151. Introduction to Latin-American Politics. *Archer*
 253S. Comparative Government and the Study of Latin America. *Archer*

Portuguese

- 111S. Portuguese for Current Affairs. *Staff*
 200S. Seminar in Portuguese Literature. *Staff*

Sociology

- 110D. Comparative Sociology: Latin America. *Staff*

Spanish

- 115, 116. Introduction to Spanish-American Literature. *Ross or staff*
 121. Latin American Literature in Translation. *Dorfman*
 143S. Literature of the Discovery and Conquest of America. *Ross*
 144S. Spanish-American Literature of Identity. *Pérez Firmat*
 145S. Literature of the Hispanic Minorities of the United States. *Pérez Firmat*
 146. The Spanish-American Novel. *Moreiras or staff*
 147S. Latin American Women Writers. *Ross*
 175S. Hispanic Literature and Popular Culture. *Sieburth*
 210. History of the Spanish Language. *Garci-Gómez*
 245. Modern Spanish-American Poetry. *Staff*

AREA COURSES: MIDDLE EAST

Arabic

- 125, 126. Advanced Arabic. *Cooke or Cornell*
 183,184. Topics in Arabic. *Cornell*

Asian and African Languages and Literature

- 173S. Women in Arabic Literature. *Cooke*

Cultural Anthropology

126. Muslim World: Transformation and Continuities. *Ewing*

History

152. Modern Middle East. *Y. Miller*
 195S.35. Palestine and the Arab-Israeli Conflict. *Y. Miller*

Interdisciplinary Courses

- 162, 163. Introduction to Islamic Civilization. *Cornell or Lawrence*

Political Science

- 100F01. Israel from Utopia to History. (Taught in Israel.) *Staff*
 235S. Comparative Development of Islam. *Staff*

Public Policy Studies

- 175S. The Palestine Problem and United States Public Policy. *Kuniholm*
 257. United States Policy in the Middle East. *Kuniholm*

Religion

134. Jewish Mysticism. *Bland*
 136. Contemporary Jewish Thought. *Bland or E. Meyers*
 164. History and Religions of North Africa. *Cornell or Lawrence*
 283. Islam and Modernism. *Lawrence*
 284. The Religion and History of Islam. *Cornell or Lawrence*

AREA COURSES: NORTH AMERICA

Art and Art History

- 174. Art and Philosophy from West Africa to the Black Americas. *Powell*
- 194. Maya Art and Culture. *Reents-Budet*

English

- 179S. Repairing the Continent: Canadian and U.S. Literary Perspectives. *A. Davidson*
- 186A,S. Canadian Literature in English. *A. Davidson*
- 186B, S. Canadian Theater. *Staff*

French

- 131S. French in the New World. *Hull*
- 168. Francophone Literature. *Mudimbe-Boyi*
- 169. The Contemporary Novel in French Canada. *Keineg*

History

- 106S. Geography of Canada. *Staff*
- 108C. Canadian-American Relations. *Thompson*
- 115. History of Africa. *Ewald*
- 119A, 119B. Native American History. *Wood*
- 121A. America in International Affairs, 1607-1861. *Davis*
- 124S. Slave Society in Colonial Anglo-America: The West Indies, South Carolina and Virginia. *Gaspar*
- 131A. History of Mexico and the Spanish Caribbean in the Nineteenth and Twentieth Centuries. *Tepaske*
- 131B. The Spanish Caribbean. *TePaske*
- 145A,B. Afro-American History. *Gavins*
- 166S. American Dreams / American Realities. *Wilson*
- 167S. United States and Canadian Constitutional Issues. *Cahow*
- 168S. The Atlantic Slave Trade. *Gaspar*
- 174A. History of Colonial Hispanic America from Pre-Columbian Times to the Wars of Independence. *TePaske*
- 183S. Canada from the French Settlement. *Cahow or Thompson*
- 195S.18. The Destruction and Aftermath of Slavery in the Americas: A Comparative Perspective. *J. Scott*
- 195S.40. Fugitive Slave (Maroon) Communities in the New World Slave Societies. *Gaspar*
- 195S.45. Canadian and American Agrarian Movements. *Thompson*
- 196S.24. Problems in Recent United States Diplomatic History. *Davis*
- 206. Origins of Afro-America. *J. Scott*
- 216S. U.S. Diplomacy, 1890-1945. *Davis*
- 233S. Slave Resistance and Social Control in New World Societies. *Gaspar*

Interdisciplinary Courses

- 98. Introduction to Canada. *Cahow or Thompson*
- 182. Media in Comparative Perspective. *Smith*
- 184S. Canadian Issues. *Staff*
- 282. Canada: Research Seminar. *Staff*

Literature

- 146. The Canadian Image: Cultural Production in French and English Canada. *A. Davidson*
- 180. Writings in the Rural Tradition: From the Caribbean to the American South. *Willis*
- 181. Literacies and Literatures in the Americas and the Caribbean. *Mignolo or Willis*

Political Science

- 100B.03. United States-Latin American Relations. (Taught in Mexico.) *Staff*
- 117. Comparative Government and Politics. *Staff*
- 203S. Issues and Politics and the Media in the United States. *Paletz*
- 266S. Comparative Social Policies. *Smith*
- 277. Comparative Party Politics. *Kornberg or Lange*
- 293. Federalism. *Staff*

Public Policy Studies

- 265S. The Process of International Negotiation. *Mayer*

Sociology

- 167. The Social Bases of Politics. *Gereffi or Smith*
- 170. Mass Communications. *Smith*
- 171. Comparative Health Care Systems. *Maddox*
- 179. Modern Nationalist Movements. *Tiryakian*
- 255. Political Sociology. *Smith or Tiryakian*

Spanish

- 107S. Spanish-American Short Fiction. *Pérez Firmat*
- 115, 116. Introduction to Spanish-American Literature. *Ross or staff*
- 143S. Literature of the Discovery and Conquest of America. *Staff*
- 145S. Literature of the Hispanic Minorities of the United States. *Pérez Firmat*
- 146. The Spanish-American Novel. *Staff*
- 245. Modern Spanish-American Poetry. *Staff*

AREA COURSES: RUSSIA

Economics

- 293. Soviet Economic History. *Tremi*
- 294S. Soviet Economic System. *Tremi*

History

- 120. History of Socialism and Communism. *Lerner*
- 161. History of Modern Russia. *M. Miller*
- 180. The Soviet Experience. *Lerner*
- 195S.30. Problems in Russian History. *M. Miller*
- 201S. The Russian Intelligentsia and the Origins of the Revolution. *M. Miller*
- 202S. The Russian Revolution. *M. Miller*
- 239S. History of Socialism and Communism. *Lerner*
- 262. Problems in Soviet History. *Lerner*

Political Science

- 165. Government and Politics of the Soviet Union. *Hough*
- 166. Soviet Foreign Relations. *Hough*

Russian

- 103, 104. Studies in Russian Language and Culture. (Taught in Russia.) *Staff*
- 129. Russian Orthodoxy. *Pelech*
- 130. Soviet Cinema. *Gaines, Jameson, and Lahusen*
- 131. Language, Culture, and Myth: The Slavic Proverb. *Dolgovva*
- 135. Contemporary Soviet Media. *Andrews*
- 150. The Languages of the Soviet Union. *Pugh*
- 155. The Interaction of Russian and American Culture. *Lahusen and Van Tuyl*
- 161, 162. Nineteenth-Century Russian Literature. *Staff*
- 168S. Russian Classical Literature and Music. *Dobrenko*
- 169. Women and Russian Literature. *Gheith*
- 170. Russian Dissident and Emigré Literature. *Lahusen*
- 172S. Pushkin and His Time. *Gheith or Van Tuyl*
- 173S. Gogol. *Lahusen*
- 175. Tolstoy. *Van Tuyl*
- 176. Dostoevsky. *Flath, Gheith, or Van Tuyl*
- 177S. Chekhov. *Flath or staff*
- 178. Russian Short Fiction. *Gheith*
- 180. Early Twentieth-Century Russian Literature: From Symbolism to the 1920s. *Lahusen*
- 181. The 1920s: The Road to a New Synthesis. *Dobrenko or Lahusen*
- 182. Socialist Realism: Soviet Literature of the 1930s and 1940s. *Dobrenko or Lahusen*
- 183. Post-Stalinist and Contemporary Soviet Literature. *Dobrenko or Lahusen*
- 184. Literature under and after Glasnost. *Dobrenko, Gheith, or Lahusen*
- 185S. Introduction to Slavic Linguistics. *Andrews*
- 186S. History of the Russian Language. *Pugh*
- 188, 189. Advanced Russian Language and Culture. (Taught in Russia.) *Staff*
- 190. Introduction to Russian Civilization. *Pelach*
- 195. Advanced Russian. *Andrews*
- 196. Advanced Russian: Readings, Translation, and Syntax. *Andrews*
- 201S.A. Comparative Slavic Linguistics: East Slavic. *Andrews or Pugh*
- 201S.B. Comparative Slavic Linguistics: West Slavic. *Andrews or Pugh*
- 201S.C. Comparative Slavic Linguistics: South Slavic. *Andrews or Pugh*
- 201S.D. Comparative Slavic Linguistics: Common Slavic. *Andrews or Pugh*
- 269. Women and Russian Literature. *Gheith*

AREA COURSES: SOUTH ASIA

Asian and African Languages and Literature

- 137. Contemporary Culture in South Asia. *Khanna*
- 138. The Media in Modern India. (Taught in India.) *Khanna*

Cultural Anthropology

120. South Asia: Institutions and Change. *Apte or Ewing*

History

100E. Indian History and the Present. (Taught in India.) *Kumar*

164. India, Pakistan, and Bangladesh: 1750 to the Present. *Richards*

195S.21. Problems in Indian History. *Richards*

248. History of Modern India and Pakistan: 1857 to the Present. *Richards*

Interdisciplinary Courses

101, 102. Introduction to the Civilizations of Southern Asia. *Khanna or staff*

162, 163. Introduction to Islamic Civilization. *Lawrence and staff*

Political Science

132. Politics of Asia. *Lomperis*

Religion

217. Islam in India. *Lawrence*

AREA COURSES: WESTERN EUROPE

Art

100. Art and Architecture of Vienna. (Taught in Austria.) *Staff*

152. Art of the Netherlands in the Sixteenth Century. *Van Miegroet*

153. Art of the Northern Netherlands in the Seventeenth Century. *Van Miegroet*

154. German Art in the Fifteenth and Sixteenth Centuries. *Van Miegroet*

155. Mercantile Culture and Arts in the Netherlands. *de Marchi and Van Miegroet*

156. Art of the Southern Netherlands in the Seventeenth Century. *Van Miegroet*

158, 159. Art and Cultural History of Flanders and the Netherlands from the Fifteenth through the Seventeenth Centuries. (Taught in Belgium/Holland.) *Van Miegroet*

161. Nineteenth-Century Art, 1789-1848: Revolution to Revolution. *Cernuschi*

167. Twentieth-Century Art, 1900-1945. *Cernuschi or Stiles*

187. Surrealism. *Stiles*

Cultural Anthropology

139. Marxism and Society. *Staff*

Distinguished Professor Course

192. French Existentialism: 1940-1960. *Mudimbe*

Economics

60. Economics of a United Europe. (Taught in Germany.) *Staff*

150. History of Economic Thought (Taught in Holland.) *De Marchi or Goodwin*

151. Adam Smith and the System of Natural Liberty. *De Marchi*

French

107S. Contemporary Ideas. *Staff*

111S. French for Current Affairs. *Staff*

113. French for Business and Law. *Staff*

136S. Life in Eighteenth-Century France. *Stewart*

137. Aspects of Contemporary French Culture (Taught in France.) *Staff*

139. French Civilization. *Keineg or Tetel*

145S. Topics in Renaissance Literature and Culture. *Tetel*

153. The French Enlightenment. *Stewart*

166, 167. Contemporary French Life and Thought. *Kaplan*

Germanic Languages and Literature

100S. Business German. *Staff*

124S. Contemporary German Women Writers. *Staff*

136S. Contemporary Germany. *Bessent or Hell*

152S. Berlin in Literature and Culture. (Taught in Germany.) *Wolfneil*

153. Aspects of Contemporary German Culture. (Taught in Germany.) *Staff*

160. German Life and Thought. *Borchardt*

245S. The Twentieth Century. *Rolleston*

247S. Postwar German Literature. *Hell*

270. Consciousness and Modern Society. *Rolleston*

History

100A. History of Modern Spain. (Taught in Spain.) *Staff*

100B. History of Renaissance Italy. (Taught in Italy.) *Witt or staff*

100C. Nineteenth-Century European Political History. (Taught in France.) *Staff*

100G. Twentieth-Century Economic and Social History of France, 1860-1944. (Taught in France.)

Staff

100K. History of Spain from Late Medieval Times to the Present. (Taught in Spain.) *Staff*

100L. German History from 1870 to 1970. (Taught in Germany.) *Staff*

100R. History of Austria. (Taught in Austria.) *Staff*

107A, 107B. History of England. *Cal or Herrup*

113. Sex, Class, and Victorians. *Thorne*

117. Early Modern Europe. *Neuschel*

135A. Germany from the Thirty Years' War to Unification in 1871. *Koonz*

135B. Germany from 1871 to 1933. *Koonz*

135C. Germany from 1933 to 1990. *Koonz*

138. Renaissance and Reformation Germany. *Robisheaux*

171A. History of Women in Early Modern Europe. *Neuschel*

171B. History of Women in Modern Europe. *Koonz*

173. History of Spain from Late Medieval Times to the Present. *TePaske*

195S.07. Religion and Society in Modern British History. *Thorne*

195S.13. Problems in Early Modern English History. *Herrup*

195S.15. Society and Polity in France, 1700 to the Present. *Reddy*

195S.26. State and Society in the Third Reich. *Koonz*

195S.28. The Spanish Civil War and Its Aftermath. *TePaske*

195S.31. History and Memory of Nazi Genocide. *Koonz*

195S.44. Popular Patriotism in Modern British History. *Thorne*

204. German Society: 1914-1945. *Koonz*

213S. Early Modern France. *Neuschel*

214. Class, Public Opinion, and the French Revolution. *Reddy*

221. Topics in Social and Economic History of Europe, 1200-1700. *Staff*

251B. Topics in the Intellectual History of Europe, 1450, 1650. *Witt*

253S, 254S. European Diplomatic History, 1871-1945. *W. Scott*

258S. Social Conflict in Weimar and Nazi Germany. *Koonz*

267S. England in the Sixteenth Century. *Herrup*

268S. England in the Seventeenth Century. *Herrup*

Interdisciplinary Courses

199S. Senior Seminar in German Studies. *Rolleston and staff*

Italian

105. Italian Women Writers. *Finucci*

131. Topics in Italian Civilization. *Finucci*

155S. Nineteenth-Century Italian Literature. *Caserta*

170. Film and the Italian Novel. *Finucci*

283. Italian Novel of the Novecento. *Caserta*

Literature

132. Dada and Surrealism. *Thomas*

Music

119. The Humanities and Music. *Bartlet*

120S. Women in Music. *Staff*

143. Beethoven and His Time. *Bartlet, Gilliam, Silbiger, or Todd*

144. Bach and His Time. *Meniker or Silbiger*

145. Mozart and His Time. *Silbiger*

156S. Music History II: Late Renaissance, Baroque. *Bartlet, Brothers, Meniker, or Silbiger*

157S. Music History III: Rococo and Classic. *Bartlet, Silbiger, or Todd*

158S. Music History IV: Romanticism and the Modern Period. *Bartlet, Gilliam, Silbiger, or Todd*

Political Science

100A.01. Germany: Environmental Policy in Europe. (Taught in Germany.) *Staff*

100A.02. From Division to Unification. (Taught in Germany.) *Staff*

100E.01. Media and Politics in Britain. (Taught in England.) *Staff*

100H.01. Italian Politics from the Risorgimento to the Present. (Taught in Italy.) *Staff*

100J.01. Government and Politics of Austria in Europe. (Taught in Austria.) *Staff*

100K.02. British Government and Constitutional Law. (Taught in England.) *Staff*

100L.01. Political System of Modern Britain. (Taught in England.) *Staff*

100M.01. Government and Politics of Spain. (Taught in Spain.) *Staff*

100N.01. The European Community: Progress, Problems and Prospects. (Taught in Brussels.) *Grieco*

115. Politics and Society in Germany. *Kitschelt*

135. Political Development of Western Europe. *Kitschelt or Lange*

136. Comparative Government and Politics: Western Europe. *Kitschelt or Lange*

- 170. Europe Transformed. *Grieco*
- 181. Marxism and Neo-Marxism. *Coles*
- 216S. Evolution of European Marxism. *Coles*
- 225. Topics in Comparative Government and Politics: Western Europe. *Kitschelt or Lange*
- 232. Political Economy: Theory and Applications. *Lange*
- 244S. The Politics of the European Community. *Grieco*

Religion

- 167. The Reformation of the Sixteenth Century. *Hillerbrand*

Sociology

- 110C. Comparative Sociology: Europe. *Staff*
- 138. History of Social Thought. *Tiryakian or Wilson*

Spanish

- 137. Aspects of Contemporary Spanish Culture. *Garci-Gómez*
- 171. Literature of Contemporary Spain. *Osuna*
- 210. History of Spanish Language. *Garci-Gómez*

THE MAJOR

Corequisite Foreign Language Requirement: Four (4) semester courses in a single language of the primary area are required. Students with advanced placement credits or other evidence of foreign language proficiency are not exempted from this requirement. However, in the following cases students may substitute one or two nonlanguage courses to meet this requirement: (1) if a second year of a language is not taught at Duke, or (2) if no language course is available at a sufficiently advanced level. In these cases, approved humanities or social science courses taught in a foreign language, or a year of general linguistics or literature in translation, may be substituted for the second year of a language. The specific language courses are too numerous to list here. Area advisors should be consulted for specific approval of the language choice if it does not conform to the list below.

Africa: Swahili; Arabic; relevant European language, such as French or Portuguese, may be used if appropriate to specific programs.

East Asia: Chinese, Japanese.

Eastern Europe: Relevant Eastern Europe language, such as Polish or Estonian.

Latin America: Spanish; Portuguese for specialization in Brazil.

Middle East: Arabic, Persian; modern Hebrew for specialization in Israel.

North America: French or Spanish.

Russia: Russian.

South Asia: Hindi-Urdu.

Western Europe: French, German, Italian, Portuguese, Spanish.

Major Requirements:

1. **Introductory Courses:** Two (2) introductory courses emphasizing comparative approaches from two different departments. One of these courses must be Comparative Area Studies 110, Global Human Geography. See list above for other introductory courses.
2. **Primary Area Courses:** Four (4) semester courses in the geographical area of special interest (the area of the language studied), with strong commendation for multidisciplinary course selection. Areas and courses are listed above. Others may be selected with the consent of the director.
3. **Secondary Concentration:** The secondary concentration must be in another geographic area. Students must take two (2). Qualifying courses are listed above.
4. **Two (2) Comparative/Global Issues Courses.** To satisfy the comparative/global issue requirements of the major, each student must elect one comparative/global issue course and also take Comparative Area Studies 125, Strategies of Comparative Analysis. Comparative Area Studies 125 will

be coordinated by faculty members affiliated with comparative area studies, but will also include guest lectures. The purpose of this course is to teach students the various strategies that can be employed in making appropriate comparisons within and across distinct regions of the world. The course will offer a lecture / discussion format, and students will be asked to write a series of brief papers that reflect the cross-cultural and interdisciplinary objectives of the major. Normally, students should take this course in their sophomore or junior year, not in their senior year.

Honors Seminar: For graduation with distinction or Latin honors by honors project, the student must complete a research project in the senior year, usually in the Comparative Area Studies 150S senior seminar. Candidates must apply in their junior year. Selection criteria will include both the feasibility of the proposed topic, and the student's ability and skills to carry it out successfully. Inquiries should be addressed to the Director, Comparative Area Studies, 2122 Campus Drive.

Computer Science (CPS)

Professor Vitter, *Chair*; Associate Professor of the Practice Ramm, *Associate Chair*; Assistant Professor of the Practice Astrachan, *Director of Undergraduate Studies*; Professors Behringer, Biermann, Gelenbe, Loveland, Marinos, Palmer, Patrick, Reif, Rose, Starmer, Trivedi, and Utku; Associate Professors Agarwal, Ellis, Gardner, Greenside, Kedem, and Wagner; Assistant Professors Board, Dollas, Kao, Nadathur, and Prisant; Professor Emeritus Gallie; Research Assistant Professors Grove, Long, and Pantazis; Adjunct Professors Brglez, Coughran, and Whitted; Adjunct Associate Professor Dugan; Adjunct Assistant Professors Levenson and Marshall

A major is available in this department.

The Department of Computer Science provides courses on the concepts of computing and computers, their capabilities, and uses. In most courses students make extensive use of the available computing facilities. Students who wish to take a single introductory course, as part of their general education, usually elect either Computer Science 10 or 50.

In cooperation with the Microelectronics Center of North Carolina (MCNC), the University of North Carolina at Chapel Hill, and other MCNC-affiliated universities in North Carolina, the department often sponsors advanced computer science and other high technology courses originating at other universities. These are available through a closed circuit television and data network belonging to MCNC. Contact the Department of Computer Science for further information on the availability of such courses.

1. Computer Science Fundamentals. (QR) An overview for students not intending to major in computer science. Computer programming, symbolic and numeric computation, electric circuits, architectures, translation, time complexity, noncomputability, and artificial intelligence. Not open to students having credit for Computer Science 50 or higher. Not open to students who have taken Computer Science 10. One course. *Biermann and staff*

4. Introduction to Pascal Programming. (QR) A study of clear thinking and problem solving using the computer. Representation, problem decomposition, and structured programming. Students learn the Pascal language and develop skills by solving a variety of symbolic and numerical problems. Not open to students who have taken Computer Science 50. One course. *Staff*

6. Introduction to Program Design and Analysis I. (QR) Problem-solving techniques using a computer, top-down decomposition and object-oriented solution methodologies, introduction to programming, programming in the C/C++ language, introduction to UNIX and programming environments, recursion, analysis of execution

times, linked data structures, searching, and sorting. Normally the first course for majors in computer science who have no programming experience. Not open to students who have taken Computer Science 8, 52, or 53. One and one-half courses. *Astrachan and staff*

8. Program Design and Analysis I. (QR) Similar to Computer Science 6 except that introductory programming is omitted. Normally the first course for majors in computer science who have proficiency in a computer programming language. Not open to students who have taken Computer Science 6 or 53. One course. *Astrachan and staff*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

100. Program Design and Analysis II. (QR) A continuation of Computer Science 6 or 8. Overview of advanced data structures and analysis of algorithms, data abstraction and abstract data types, object-oriented programming, proofs of correctness, complexity, and computability. Not open to students who have taken Computer Science 103. Prerequisite: Computer Science 6, 8, 52, or 53. One course. *Astrachan and staff*

104. Computer Organization and Programming. (QR) Computer structure, machine language, instruction execution, addressing techniques, and digital representation of data. Computer systems organization, logic design, microprogramming, and interpreters. Symbolic coding and assembly systems. Prerequisite: Computer Science 100 or 103 or consent of instructor. One course. *Ramm and staff*

106. Programming Languages. (QR) Syntax and semantics of programming languages. Compilation, interpretation, and programming environments; including programming languages such as Algol, PL/1, Pascal, APL, LISP, and Prolog. Exercises in programming. Prerequisite: Computer Science 104. One course. *Staff*

108. Software Design and Implementation. (QR) Techniques for design and construction of reliable, maintainable and useful software systems. Programming paradigms and tools for medium to large projects: revision control, UNIX tools, performance analysis, GUI, software engineering, testing, documentation. Prerequisite: Computer Science 100 or 103. One course. *Staff*

109. Program Design and Construction. (QR) Substantial programs. Design specifications, choice of data structures, estimation of programming effort, stepwise development, and program-testing methodology. Programming teams and human factors in system implementation. Advanced topics in use of a procedural language and file management. Not open to students who have taken Computer Science 155. Prerequisite: Computer Science 104. One course. *Staff*

110. Introduction to Operating Systems. (QR) Basic concepts and principles of multiprogrammed operating systems. Processes, interprocess communication, CPU scheduling, mutual exclusion, deadlocks, memory management, I/O devices, file systems, protection mechanisms. Not open to students who have taken Computer Science 131. Prerequisites: Computer Science 100 or 103 and 104. One course. *Staff*

120. Introduction to Switching Theory and Logic Design. (QR) Not open to students who have taken Computer Science 157. See C-L: Electrical Engineering 151. One course. *Marinos or Overhauser*

130. Introduction to the Design and Analysis of Algorithms. (QR) Design and analysis of efficient algorithms for sorting, searching, dynamic structure manipulation, pathfinding, fast multiplication, and others; nondeterministic algorithms and computationally hard problems. Not open to students who have taken Computer Science 174. Prerequisites: Computer Science 100 or equivalent and four semesters of college mathematics. One course. *Staff*

140. Mathematical Foundations of Computer Science. (QR) An introduction to theoretical computer science including studies of abstract machines, the language hierarchy from regular sets to recursively enumerable sets, noncomputability, and complexity theory. Not open to students who have taken Computer Science 125. Prerequisites: Computer Science 8 or 53 and 100 or 103 and Mathematics 103. One course. *Loveland*

150. Introduction to Numerical Methods and Analysis. (QR) Theory, algorithms, and software that concern numerical solution of linear equations, approximation and interpolation of functions, numerical solution of nonlinear equations, and numerical solution of ordinary differential equations. Not open to students who have taken Computer Science 121. Prerequisite: Computer Science 8 or 53; Mathematics 31; 32; 104 or 111. One course. *Staff*

170. Methodologies in Artificial Intelligence. (QR) Theories of representation and search in artificial intelligence. Logic, semantic networks, production rules, frames, distributed models, and procedural representations; algorithmic and heuristic search. Not open to students who have taken Computer Science 115. One course. *Biermann, Loveland, or Nadathur*

191, 192. Independent Study. Directed reading and research for qualified juniors. Consent of instructor and Director of Undergraduate Studies required. One course each. *Staff*

193, 194. Independent Study. Directed reading and research for qualified seniors. Consent of instructor and Director of Undergraduate Studies required. One course each. *Staff*

196. Topics in Computer Science. (QR) Topics from various areas of computer science, changing each year. Prerequisites: Computer Science 8 and 100 or equivalent. One course. *Staff*

198S. Seminar in Research Practice and Methodology. (QR) Methodologies in the formulation, analysis, and solution of ill-posed and ill-structured problems. General research techniques, mathematical modeling, search methodologies, experimental design, simulation, statistical analysis, report writing. Not open to students who have taken Computer Science 185S. Prerequisites: four courses in mathematics (MTH 31 or above), four courses in computer science (CPS 8 or 53 or above), and one course in statistics. One course. *Biermann and staff*

For Seniors and Graduates

206. Programming Languages. (QR) Information binding, data structures and storage, control structures, recursion, execution environments, input/output; syntax and semantics of languages; study of PL/1, Fortran, Algol, APL, LISP, SNOBOL, and SIMULA; exercises in programming. Not open to students who have taken Computer Science 201. Prerequisite: Computer Science 200 or 208. One course. *Staff*

208. Programming Methodology. (QR) Practical and theoretical topics including structured programming, specification and documentation of programs, debugging and testing strategies, choice and effective use of programming languages and systems, psychology of computer programming, proof of correctness of programs, analysis of algorithms, and properties of program schemata. Not open to students who have taken Computer Science 200. Prerequisite: Computer Science 100 or 103. One course. *Staff*

210. Operating Systems. (QR) Fundamental principles of operating system design applied to state-of-the-art computing environments (multiprocessors and distributed systems) including process management (coscheduling and load balancing), shared

memory management (data migration and consistency), and distributed file systems. Advanced topics include transaction-based operating systems, reliable communication protocols, concurrency control and recovery mechanisms, computer security, and performance analysis. Not open to students who have taken Computer Science 231. One course. *Ellis*

214. Computer Networks and Distributed Systems. (QR) Basic systems support for process-to-process communications across a computer network. The TCP/IP protocol suite and the Berkeley sockets application programs interface. Development of network application programs based on the client-server model. Remote procedure call and implementation of remote procedure call. Not open to students who have taken Computer Science 255. Prerequisite: knowledge of the C programming language. One course. *Staff*

216. Data Base Methodology. (QR) Basic concepts and principles. Relational, hierarchical, and network approaches to data organization; data entry and query language support for data base systems; theories of data organization; security and privacy issues. Not open to students who have taken Computer Science 241. Prerequisites: Computer Science 104 and either 109 or 155 or equivalent. One course. *Staff*

218. Compiler Construction. (QR) Models and techniques used in the design and implementation of assemblers, interpreters, and compilers. Lexical analysis, compilation of arithmetic expressions and simple statements, specifications of syntax, algorithms for syntactic analysis, code generation and optimization techniques. Not open to students who have taken Computer Science 232 before fall 1994. One course. *Staff*

220. Computer Systems Organization. Hardware and software aspects. Processor, memory, device, and communication subsystems; case studies of hardware system organization, for example, parallel, associative, fault-tolerant; organization of software systems to exploit hardware systems organization; economic and reliability aspects of various hardware organizations. Not open to students who have taken Computer Science 252 before fall 1994. Prerequisites: Computer Science 104 and 120 or 157. One course. *Wagner*

222. Introduction to VLSI Systems. A first course in VLSI design with CMOS technologies. A study of devices, circuits, fabrication technology, logic design techniques, subsystem design and system architecture. Modeling of circuits and subsystems. Testing of gates, subsystems and chips, and design for testability. The fundamentals of full-custom design, and some semi-custom design. Not open to students who have taken Computer Science 210 before fall 1994. Prerequisite: Electrical Engineering 151 or equivalent; Electrical Engineering 161 or equivalent. One course. *Dollas or Kedem*

223. Application Specific VLSI Design. (QR) Introductory VLSI design course. Modern design methods and technology for implementing application specific integrated circuits (ASICs). Semicustom design methodology, semicustom VLSI technologies such as gate arrays, standard cells and FPGAs; the use of ASIC Computer Aided Design (CAD) tools. Mapping algorithms into high performance silicon implementation. Prerequisite: course in logic design. One course. *Kedem*

225. Fault-Tolerant and Testable Computer Systems. Not open to students who have taken Computer Science 207. Prerequisite: Electrical Engineering 151 or equivalent. See C-L: Electrical Engineering 254. One course. *Marinos*

226. Mathematical Methods for Systems Analysis I. (QR) Basic concepts and techniques used in the stochastic modeling of systems. Elements of probability, statistics, queuing theory, and simulation. Prerequisite: four semesters of college mathematics. C-L: Electrical Engineering 255. One course. *Trivedi*

228. Communication, Computation, and Memory in Biological Systems. (QR) Communication and memory in biological systems: voltage sensitive ion channels, hormone-receptor interactions, and initiation and control of RNA/DNA synthesis. Models of signaling and memory are developed and related to electronic signaling schemes. Not open to students who have taken Computer Science 276. Prerequisites: Computer Science 100 or 103, two semesters of college chemistry, and four semesters of college mathematics. One course. *Starmer*

230. Design and Analysis of Algorithms. (QR) Design and analysis of efficient algorithms. Algorithmic paradigms. Applications include sorting, searching, dynamic structures, graph algorithms, randomized algorithms. Computationally hard problems. NP completeness. Not open to students who have taken Computer Science 205. Prerequisite: Computer Science 100 or equivalent. One course. *Staff*

232. Mathematical Analysis of Algorithms. (QR) Techniques for efficient implementation and precise analysis of computer algorithms. Combinatorial mathematics and elementary probability. Emphasis on obtaining exact closed-form expressions describing the worst-case or average-case time and space requirements for particular computer algorithms, whenever possible. Asymptotic methods of analysis for obtaining approximate expressions in situations where exact expressions are too difficult to obtain or to interpret. Not open to students who have taken Computer Science 202. Prerequisites: Mathematics 103 and 104 or equivalents. One course. *Staff*

234. Computational Geometry. (QR) Models of computation and lower-bound techniques; storing and manipulating orthogonal objects; orthogonal and simplex range searching, convex hulls, planar point location, proximity problems, arrangements, linear programming and parametric search technique, probabilistic and incremental algorithms. Not open to students who have taken Computer Science 240 before fall 1994. Prerequisite: Computer Science 205 or 230 or equivalent. One course. *Agarwal or Reif*

236. Parallel Algorithms. (QR) Models of parallel computation including parallel random access machines, circuits, and networks; NC algorithms and P-completeness; graph algorithms, sorting algorithms, network routing, tree contraction, string matching, parsing algorithms; randomization and derandomization techniques. Not open to students who have taken Computer Science 230 before fall 1994. Prerequisite: Computer Science 205 or 230 or equivalent. One course. *Kao or Reif*

238. Numerical and Algebraic Algorithms. (QR) Introduction to polynomial problems, matrix problems—general and sparse; numerical algorithms, fast Fourier transform, eigenvalue computation, number theory and cryptography. Not open to students who have taken Computer Science 206 before fall 1994. Prerequisites: Computer Science 230 and 252, or equivalents. One course. *Reif or Rose*

240. Computational Complexity. (QR) Turing machines, undecidability, recursive function theory, complexity measures, reduction and completeness, NP, NP-Completeness, co-NP, beyond NP, relativized complexity, circuit complexity, alternation, polynomial time hierarchy, parallel and randomized computation, algebraic methods in complexity theory, communication complexity. Not open to students who have taken Computer Science 225 before fall 1994. Prerequisite: Computer Science 140 or equivalent. One course. *Agarwal*

242. Logic for Computer Science. (QR) Aspects of logic with a focus on computational issues. Topics include propositional and predicate calculi and the theory underlying their automation, that is, the compactness theorems, the Herbrand-Skolem-Gödel theorem, unification, and resolution. Proof procedures and their search characteristics. The use of natural deduction and sequent calculi in describing logics, specifying programming language semantics and formalizing type systems. Structural properties,

such as cut-elimination, in such systems. The logical systems underlying programming languages like Prolog and ML. Applications of logic in automated reasoning, program verification and synthesis. Not open to students who have taken CPS 218 before fall 1994. C-L: Philosophy 210. One course. *Loevland or Nadathur*

250. Numerical Analysis. (QR) Error analysis, interpolation and spline approximation, numerical differentiation and integration, solutions of linear systems, nonlinear equations, and ordinary differential equations. Not open to students who have taken Computer Science 221. Prerequisites: knowledge of an algorithmic programming language, intermediate calculus including some differential equations, and Mathematics 104. C-L: Mathematics 221 and Statistics 273. One course. *Gardner, Greenside, or Rose*

252. Numerical Differential Equations. (QR) Numerical methods for solving ordinary and partial differential equations emphasizing nonlinear differential equations. Methods for solving ordinary differential equations that generalize to solve partial differential equations: finite difference, spectral, and finite element methods. Solution of hyperbolic, parabolic, and elliptical partial differential equations arising in scientific problems. Not open to students who have taken Computer Science 222 before fall 1994. Prerequisite: Computer Science 221 or 250. C-L: Mathematics 222. One course. *Gardner, Greenside, or Rose*

254. Numerical Linear Algebra. (QR) Solution of large, sparse linear systems of equations. Storage schemes, graph theory for sparse matrices, different orderings to minimize fill, block factorizations, iterative methods, analysis of different splittings, conjugate gradient methods. Eigenvalue problems, QR factorization, Lanczos method, power method and inverse iteration, Rayleigh quotient. Not open to students who have taken Computer Science 223 before fall 1994. Prerequisite: Computer Science 221 or 250 or equivalent. C-L: Mathematics 223. One course. *Rose*

256. Functional Analysis for Scientific Computing. (QR) Linear spaces, topologies, norms, and completeness. Focus on Banach and Hilbert spaces including Sobolev spaces. Linear and nonlinear operators. Fréchet derivatives. Iterative methods for nonlinear operator systems, such as Newton-like methods. Applications. Intended for science and engineering students but not mathematics graduate students. Not open to students who have taken Computer Science 245. Prerequisite: Computer Science 221 or 250. C-L: Mathematics 245. One course. *Rose*

260. Introduction to Scientific Computing. Practical introduction for students and faculty to computer resources that facilitate scientific research: scientific word processing (Tex and LaTeX), symbolic manipulation programs, software tools, numerical software packages, and graphics. Case studies used to illustrate these resources. For noncomputer scientists. Not open to students who have taken Computer Science 212. Prerequisite: Mathematics 103, 104, or equivalent; some programming experience. One course. *Gardner or Greenside*

264. Nonlinear Dynamics. (QR) Introduction to the mathematical theory of nonlinear dynamics, and how this theory compares with physical experiments, with applications to biology (Turing states and morphogenesis), computer science (randomness and computability), mathematics (chaos and strange attractors), and physics (pattern formation and transition to turbulence). Not open to students who have taken Computer Science 213. Prerequisites: Computer Science 8 or 53, Mathematics 111, and Physics 51L, 52L. C-L: Physics 213. One course. *Behringer or Greenside*

270. Artificial Intelligence. (QR) Heuristic versus algorithmic methods; programming of games such as chess; theorem proving and its relation to correctness of programs; readings in simulation of cognitive processes, problem solving, semantic memory, analogy, adaptive learning. Not open to students who have taken Computer

Science 215. Prerequisite: Computer Science 100 or 103 or consent of instructor. One course. *Biermann, Loveland, or Nadathur*

274S. Computational Linguistics Seminar. (QR) Readings and research seminar on topics related to the processing of English or other natural languages: syntax, semantics, pragmatics, discourse, and others. Not open to students who have taken Computer Science 216S. Prerequisite: Computer Science 215 or 270 or consent of instructor. One course. *Biermann*

291. Reading and Research in Systems. (QR) One course. *Staff*

292. Reading and Research in Algorithms and Complexity. (QR) One course. *Staff*

293. Reading and Research in Scientific Computing. (QR) One course. *Staff*

294. Reading and Research in Artificial Intelligence. (QR) One course. *Staff*

296. Advanced Topics in Computer Science. Not open to students who have taken Computer Science 265. One course. *Staff*

THE MAJOR

For the A.B. Degree

Prerequisites. Mathematics 31, 32.

Major Requirements. Computer Science 6 or 8, 100, 104, 108, 110, and 130; two electives at the 100 level or above: one in mathematics, and one in computer science or electrical engineering; and Mathematics 135 or Statistics 112. Suggested sequences to fill these elective slots would be a scientific computing sequence: Mathematics 104 and Computer Science 150, or the general symbolic computation sequence: Mathematics 187 and Computer Science 170 or 198. If Mathematics 135 is elected, it is recommended that it be followed by Mathematics 136. Students must complete at least five additional courses at the 100 level or above (excluding the above listed requirements). The five courses may be a mixture of courses in Computer Science and/or one other department, or with the approval of the director of undergraduate studies, may consist of a coherent plan of courses drawn from multiple departments.

For the B.S. Degree

Prerequisites. Mathematics 31, 32, 103, 104; one of the following pairs of courses: Chemistry 11L, 12L or Physics 51L, 52L or Physics 53L, 54L or Physics 41L, 42L.

Major Requirements. Computer Science 6 or 8, 100, 104, 108, 110, 130, 140, and 150; two elective courses at the 100 level or above in computer science, electrical engineering, or mathematics; Electrical Engineering 151; Mathematics 135 or Statistics 112; and Mathematics 124 or 187. If Mathematics 135 is selected, it is recommended that Mathematics 136 be taken also.

Honors/Distinction

Students who are qualified (see the section on honors in this bulletin) may undertake work leading to a B.A. or B.S. degree with distinction in computer science by applying to the director of undergraduate studies. Normally, candidates must have grades of *A* in computer science courses. They must complete a substantial project, suitably documented, or a distinguished paper on which they will be examined orally by a committee of three faculty members.

Cultural Anthropology (CA)

Associate Professor Quinn, *Chair*; Assistant Professor Starn, *Director of Undergraduate Studies*; Professors Apte, Mudimbe (literature), O'Barr, and Reddy (history); Associate Professor Silverblatt; Assistant Professors Allison, Ewing, Strauss, and Tetel (English); Professors Emeriti Friedl and LaBarre; Assistant Research Professor Chandler (English); Assistant Professor of the Practice Luttrell; Adjunct Professor Conley

A major is available in this department.

Cultural anthropology is a comparative discipline that studies the world's peoples and cultures. It extends perspectives developed from anthropology's initial encounter with the "primitive" world to studies of complex societies including rural and urban segments of the Third World and contemporary industrial countries. Cultural anthropologists at Duke concentrate on political economy, culture, ideology, history, and discourse, and the relations among them. These concerns lead them to such specific research and teaching interests as: colonialism and state formation; the role of culture in cognition; the politics of representation and interpretation; the bases of ideological persuasion and resistance; gender ideology; language use in institutional contexts; class formation and political consciousness; the creation and use of ethnic and national identities. The department also offers courses that introduce the various traditional subfields of cultural anthropology, and other, integrative courses on world areas. Students without prerequisites for a course may ask the instructor for admission.

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

94. Introduction to Cultural Anthropology. (SS) Theoretical approaches to analyzing cultural beliefs and practices cross-culturally; application of specific approaches to case material from present and/or past cultures. C-L: Comparative Area Studies. One course. *Staff*

100. Foundations of Cultural Anthropology. (SS) Major schools and theories of cultural anthropology. Required course for cultural anthropology majors. Normally taken in sophomore or junior years. C-L: Comparative Area Studies. One course. *Staff*

101, 102. Introduction to the Civilizations of Southern Asia. (CZ) See C-L: Interdisciplinary Course 101, 102; also C-L: Asian and African Languages and Literature 160, 161; Comparative Area Studies; History 193, 194; and Religion 160, 161. One course each. *Khanna or staff*

105S. Theme Seminar. Topics vary. One course. *Staff*

107. Introduction to Linguistics. (SS) Origin and nature of language; methods of descriptive linguistics with reference to historical and comparative linguistics. C-L: English 111, Interdisciplinary Course 111, and Linguistics. One course. *Butters or Tetel*

109. Contemporary Global Issues. (SS) See C-L: Comparative Area Studies 109; also C-L: History 109, Political Science 160, and Sociology 175. One course. *Staff*

110. Advertising and Society. (SS) History and development of commercial advertising; advertising as a reflector and/or creator of social and cultural values; advertisements as cultural myths; effects on children, women, and ethnic minorities; advertising and language; relation to political and economic structure; and advertising and world culture. Primary emphasis on American society with consideration of selected other cultures. C-L: English 120, Film and Video, Sociology 160, and Women's Studies. One course. *Luttrell, O'Barr, J. Smith, or Wilson*

111. Anthropology of Law. (SS) Comparative approach to jurisprudence and legal practice, dispute resolution, law-making institutions and processes, and the relation of law to politics, culture, and values. One course. *Conley or O'Barr*

112. Current Topics in Linguistics. (SS) Advanced study of an area of linguistics or grammar. C-L: English 119, Interdisciplinary Course 119, and Linguistics. One course. *Staff*

113. The Cultural Construction of Gender. (SS) Explanation of differing gender beliefs cross-culturally. Comparison of these belief complexes with dominant themes about gender in our own culture and history, in contemporary ideological struggles, and most especially, in gender origin myths constructed by social scientists. C-L: Women's Studies. One course. *Allison or Quinn*

114. Gender Inequality. (SS) Universalistic theories of gender inequality posited on biological sex differences and differences in early psychological experience. Evolutionary theories that point to the existence of egalitarian societies and the appearance of gender inequality only with the emergence of ranking, stratified societies. The rise of the state; examination of the form of gender inequality in state societies. C-L: Comparative Area Studies and Women's Studies. One course. *Quinn or Starn*

116. Language, Ethnicity, and New Nations. (SS) Examination of the issues involved in language policy and planning and their impact on national integration in the newly independent multiethnic and multilingual nations of Asia and Africa. One course. *Staff*

119. Language, Culture, and Society. (SS) Analysis of language behavior within and across societies. Topics include the relation of language structures to cultural values, the role of speech in expressing and creating relations of power and intimacy, and the way social ideologies shape different kinds of discourse. C-L: Comparative Area Studies and Linguistics. One course. *Apte, O'Barr, or Strauss*

120. South Asia: Institutions and Change. (CZ) Cultures and societies of India, Pakistan, Sri Lanka, Bangladesh, Nepal, and Bhutan with emphasis on social institutions, behavioral patterns, value systems, and sociocultural change. C-L: Comparative Area Studies. One course. *Apte or Ewing*

122. Modern Africa. (CZ) Cultures and societies of Africa through the study of kinship, politics, economics, ecology, religion, and aesthetics in the context of colonialism and postcolonialism. C-L: African and Afro-American Studies 122 and Comparative Area Studies. One course. *O'Barr*

124S. American Indian Peoples. (CZ) Past and contemporary conditions of American Indian life, with an emphasis on North America. Social and political organization, gender relations, changing economic patterns, cultural themes and variations, spirituality, the effects of anti-Indian wars, policies, and prejudice, and the emergence of movements for self-determination. C-L: Comparative Area Studies. One course. *Staff*

125. Strategies of Comparative Analysis. (SS) See C-L: Comparative Area Studies 125; also C-L: History 137, Political Science 125, Religion 121, and Sociology 125. One course. *Staff*

126. Muslim World: Transformations and Continuities. (SS) The diversity of social practices within the community of Islam. Particular emphasis on gender relations, religious movements, and social change. C-L: Comparative Area Studies and Women's Studies. One course. *Ewing*

135. United States' Culture: Research and Analysis. (SS) The meaning of United States' culture viewed through topics such as individualism, love, marriage, religion, ethnicity, racism, poverty, wealth, gender, and family. One course. *Luttrell, Quinn, or Strauss*

139. Marxism and Society. (SS) A critical appraisal of Marxism as a scholarly methodology for understanding human societies. The basic concepts of historical materialism, as they have evolved and developed in historical contexts. Topics include sexual and social inequality, alienation, class formation, imperialism, and revolution. Core course for the program in Perspectives on Marxism and Society. C-L: Comparative Area Studies, Education 139, History 186, Interdisciplinary Course 139, Literature 139, and Sociology 139. One course. *Staff*

141. The Self and the Other. (SS) The nature of human social identities, the contexts in which they are shaped, and the processes by which they change. C-L: Women's Studies. One course. *Apte, Ewing, or Luttrell*

143. Education, Culture, and Society. (SS) How social divisions and inequalities are created and challenged through the schooling process. Primary emphasis on American education. One course. *Luttrell*

145. Medical Anthropology. (SS) The role of cultural beliefs, social organization, poverty, and privilege in shaping disease and illness, healing and health care delivery, and patient-healer relationships. One course. *Staff*

147, 148. Introduction to Islamic Civilization. (CZ) See C-L: Interdisciplinary Course 162, 163; also C-L: Comparative Area Studies; History 101G, 102G; Medieval and Renaissance Studies; and Religion 162, 163. One course each. *Cornell, Lawrence, and staff*

151. Culture and Thought. (SS) The cultural basis of understanding, including feeling, motivation, and cognitive tasks such as reasoning and categorizing. Reconstruction of cultural assumptions from discourse. Evidence for cross-cultural variation and cultural universals in human thought. Not open to students who have taken Cultural Anthropology 251 (Cognitive Anthropology). One course. *Quinn or Strauss*

161. Anthropological Approaches to Religion. (SS) Cross-cultural perspectives on the relationship of religion to experience, behavior, conflict, and change. C-L: Comparative Area Studies. One course. *Ewing*

163. Foundations of Chinese Civilization. (CZ) The contemporary experience in China and its relation to ethnic, spiritual, social, aesthetic, moral, political, and economic themes in China's past. (Taught in China.) Not open to students who have taken History 163. C-L: Comparative Area Studies and History 100J. One course. *Staff*

165. Psychological Anthropology. (SS) Theoretical approaches to questions concerning the relationship between the individual and society and the formative influence of culture on personality. One course. *Ewing*

180. Current Issues in Anthropology. (SS) Selected topics in methodology, theory, or area. One course. *Staff*

180S. Current Issues in Anthropology. (SS) Same as Cultural Anthropology 180 except instruction is provided in seminar format. One course. *Staff*

184S. Canadian Issues. (SS) Prerequisite: Interdisciplinary Course 98 or consent of instructor. See C-L: Interdisciplinary Course 184S; also C-L: Canadian Studies, Comparative Area Studies, Economics 184S, History 184S, Political Science 184S, and Sociology 184S. One course. *Staff*

193. Independent Study. Directed reading and research. Open only to qualified seniors, with consent of Director of Undergraduate Studies. One course. *Staff*

195S, 196S. Senior Seminar. Consent of director of undergraduate studies required. One course each. *Staff*

For Seniors and Graduates

207S. Anthropology and History. (SS) Recent scholarship that combines anthropology and history, including culture history, ethnohistory, the study of mentalité, structural history, and cultural biography. The value of the concept of culture to history and the concepts of duration and event for anthropology. Prerequisite: major in history, one of the social sciences, or comparative area studies; or graduate standing. C-L: History 210S. One course. *Reddy*

211S. Ethnography of Communication. (SS) History of the mutual influence of linguistics and anthropology leading to the development of ethnography of speaking, ethnoscience, structuralism, and sociolinguistics. Topics vary each semester. Prerequisite: Cultural Anthropology 107 or 119. C-L: Linguistics. One course. *Apte or O'Barr*

214. Postmodernism and the Problem of Representation. (SS) How postmodernism has shaped recent anthropological discourse. Analysis of the premises of postmodernist epistemology and identification of key issues such as truth, authority, and power that are raised by postmodernist critiques of ethnographic representation. Examination of both traditional and experimental ethnographies. One course. *Ewing*

215S. The Anthropology of Women: Theoretical Issues. (SS) Topic to be selected each semester from: gender ideology, women and work, gender inequality, the history of feminist anthropology, or others. C-L: Women's Studies. One course. *Luttrell, Quinn, or Starn*

216S. Gender, Race, and Class. (SS) Gender, race, and class as theoretical constructs and lived experiences. Analytical frameworks include social history, discourse analysis, critical theory, cultural studies, and feminist theories. Consent of instructor required. One course. *Luttrell*

234S. Political Economy of Development: Theories of Change in the Third World. (SS) See C-L: Political Science 234S; also C-L: Comparative Area Studies, History 234S, Interdisciplinary Course 234S, and Sociology 234S. One course. *Staff*

250S. Culture and Discourse. (SS) Theoretical approach to culture and methods for the investigation of culture through analysis of discourse, especially interview texts. Application of this approach and these methods to the study of a domain of American culture. C-L: Linguistics. One course. *Apte, Ewing, O'Barr, Quinn, or Strauss*

251. Cognitive Anthropology. (SS) A cognitively-based theory of culture, its history, justification, substantiation through discourse analysis, application to everyday understanding, feeling and motivation, and implications for the acquisition of culture, cross-cultural variation and cultural universals in human thought. Not open to students who have taken Cultural Anthropology 151. One course. *Quinn or Strauss*

253S. Cross-Cultural Studies of Humor. (SS) Sociocultural basis, nature, scope, and function of humor. One course. *Apte*

257S. Food in Cross-Cultural Perspectives. (SS) The behavioral, institutional, linguistic, religious, and ideological aspects in relation to the production, distribution, and consumption of food within and across cultures. C-L: Comparative Area Studies. One course. *Apte*

258S. Theories of Symbolism. (SS) Influential interpretations of symbols, what they do, and how they do it. The relationship of language to symbolism and symbolism to power. Prerequisites: junior/senior status and at least two courses in cultural anthropology, or graduate standing. One course. *Ewing*

261. Religion: Tradition and Cultural Innovation. (SS) Analysis of anthropological approaches to religion, with an emphasis on how these theories account for conflict and change as they are manifested in religious symbols and ritual action. One course. *Ewing*

262S. Anthropology and Folklore. (SS) Origins, conceptualizations and theoretical orientations, methodology, and subject matter of the discipline of folklore and exploration of its similarities with and differences from sociocultural anthropology. One course. *Apte*

265S. Anthropological Approaches to Life History. (SS) Form and function of life history and its linkages to socio-cultural system; methodology for collecting life history in ethnographic fieldwork; textual, social-structural, and interpretive analyses of life history. One course. *Apte*

280S, 281S. Seminar in Selected Topics. Special topics in methodology, theory, or area. Consent of instructor required. One course each. *Staff*

282S. Canada. (SS) See C-L: History 282S; also C-L: Canadian Studies, Comparative Area Studies, Economics 282S, Interdisciplinary Course 282S, Political Science 282S, and Sociology 282S. One course. *Staff*

COURSES CURRENTLY UNSCHEDULED

94S. Introduction to Cultural Anthropology. (SS)

118S. The Language of Advertising. (SS)

123. Societies of Mediterranean Europe. (CZ)

132. Anthropology of Peace and War. (SS)

140. The Anthropology of Race. (SS)

164. Peasantry and Peasant Movements. (SS)

173. Revolutions in Latin America. (CZ)

201S. Marxism and Anthropology. (SS)

208S. Postcolonial Anthropology. (SS)

219. Language and Social Theory. (SS)

239. Culture and Ideology. (SS)

252S. American Marriage: A Cultural Approach. (SS)

272S. Marxism and Feminism. (SS)

THE MAJOR

Major Requirements. A total of eight courses distributed in the following manner:

—Cultural Anthropology 100.

—At least three courses at the 100-level taught by individuals with actual appointments in cultural anthropology, not just cross-listed with cultural anthropology. At present, the list of courses fulfilling this requirement consists of Cultural Anthropology 110, 111, 113, 114, 118S, 119, 120, 122, 124S, 126, 132, 135, 139, 141, 143, 145, 151, 155, 162S, 165, 173, 180, 180S, 193, 195S, and 196S.

—At least two 200-level courses from the cultural anthropology department's course list.

—Any two additional courses from the cultural anthropology department's course list, not more than one below the 100-level.

Suggested Work in Related Disciplines. Related courses in other departments are strongly advised. Each student's advisor will recommend a program of related work to complement the student's concentration and interests in cultural anthropology.

Honors/Distinction. The department offers an intensive and personalized honors program to qualified seniors, who research and write a senior honors thesis on a topic of their own choice in close collaboration with members of the cultural anthropology faculty. Admission to the program requires a 3.3 grade point average overall and a 3.3 grade point average in the major, both of which must be maintained to graduation for the student to be eligible for Latin honors. Qualified juniors will be notified each year by the director of undergraduate studies about their eligibility. To pursue honors, students must then enroll in the senior seminar, Cultural Anthropology 195S and Cultural Anthropology 196S, in the fall and spring of their senior year, where they will learn about research methods and prepare a thesis. Credit for Cultural Anthropology 195S and Cultural Anthropology 196S is given for a passing grade whether or not the student is awarded honors. The thesis can be based on original fieldwork on a topic of the student's choice, archival or library research, or some combination of various anthropological methods. Previous topics have ranged from studies of the influence of feminism in cultural anthropology to causes of revolution in Latin America and patterns of socialization of Mormon youth in Utah. The student also forms a supervisory committee for the thesis during the fall of the senior year. It should consist of three faculty members, who offer the student advice and support in preparing the thesis. At least two of the members must be faculty from the cultural anthropology department. Due in April of the senior year, the thesis must be judged of at least B+ quality by the supervisory committee to receive Latin honors. In addition, the student must pass an oral examination on the thesis, which is given on its completion by the supervisory committee. Students who fulfill the above requirements both graduate with distinction in cultural anthropology and receive Latin honors. A typical sequence would be:

- select a research topic;
- take the senior seminar in fall and spring;
- form a supervisory committee;
- complete the research and writing by April and submit the final draft to the supervisory committee;
- schedule the oral defense for some time in early or mid-April;
- defend the thesis in an oral examination given by the supervisory committee.

Students who have a 3.0 grade point average overall and a 3.3 grade point average in the major, both of which must be maintained to graduation, may also enroll in Cultural Anthropology 195S and Cultural Anthropology 196S to pursue graduation with distinction in cultural anthropology. With the exception of the lower overall grade point average requirement, the requirements for distinction are the same as those for Latin honors, including the writing and approval of a thesis.

Dance Program (DAN)

Associate Professor of the Practice Dickinson, *Director of the Program* and *Director of Undergraduate Studies*; Professor of the Practice Taliaferro; Assistant Professors of the Practice Childs and Dorrance; Instructor Davis

A certificate, but not a major, is available in this program.

The Dance Program offers its students the opportunity to study modern dance, ballet, dance history, choreography, repertory, and non-Western dance forms in an environment that challenges the student's intellectual, expressive, and physical capabilities. A balanced integration between the creative/performance and the historical/theoretical aspects of dance is emphasized. Academic courses in dance provide a historical and theoretical foundation for the student's creative work. In turn, the student's participation in dance creation and performance, and the development of

technical skill, deepen the student's scholarly appreciation of the medium. With this approach the aim of the program is to develop students who are sensitive physical communicators of the visual art of dance and who are articulate spokespeople for the art form.

Courses in technique and performance (partial credit courses) and theory courses (whole course credit) are offered. Dance theory courses fulfill seminar and the arts and literature area of knowledge requirements. Courses in technique and performance may be repeated for credit. A maximum total of four course credits (made up of partial credit courses) in technique and performance courses may count toward the thirty-four courses required for graduation.

The certificate, representing an area of concentration supplementing but not replacing a major, is available to all students in the program who meet the following requirements. To earn the certificate in dance, students take six course credits: one year (equivalent of one course credit) of Dance 81 (Repertory), and five full-credit courses including 101 (Introduction to Dance); either 129S (Dance as a Western Theater Art before 1900) or 131S (Modern Dance: History and Theory I) or 133 (History of African American Dance); 135S (Dance Composition); and two additional courses in dance at the 100 level or above. The student is expected to attain and/or maintain the high intermediate level of either modern dance or ballet technique.

Students are urged to enroll in at least one summer session with the American Dance Festival. If appropriate to the student's specific course of study, one course credit earned at the American Dance Festival may be counted toward the certificate requirements.

Through the Duke in New York Arts Program, a student has the opportunity in the fall semester of the junior or senior year to pursue the study of dance in New York City. Appropriate courses taken at New York University may fulfill certificate requirements.

Courses in Technique and Performance

60. Beginning Modern Dance I. A movement course exploring modern dance through technique, improvisation, and composition. No previous dance experience necessary. Half course. *Staff*

61. Beginning Modern Dance II. Prerequisite: Dance 60 or equivalent. Half course. *Staff*

62. Intermediate Modern Dance I. Increased complexity of movement sequences and greater emphasis on clarity of expression and quality of performance. Prerequisite: Dance 61 or equivalent. Half course. *Staff*

63. Intermediate Modern Dance II. Continuation of Dance 62. Prerequisite: Dance 62 or equivalent. Half course. *Staff*

64. Advanced Modern Dance. Prerequisite: Dance 63 or equivalent. Half course. *Staff*

67. Intermediate Tap Dance Technique. Prerequisite: minimum one year of study in tap dance. Half course. *Staff*

68. Ballet Fundamentals. Fundamentals of classical ballet technique concentrating on correct placement and body alignment within the ballet vocabulary. No previous dance experience necessary. Half course. *Dorrance*

69. Elementary Jazz Dance. No previous dance experience required. Half course. *Childs*

70. Elementary/Intermediate Ballet. Barre work concentrating on body alignment and correct placement within the ballet vocabulary followed by center adagio and allegro sequences. Prerequisite: Dance 68 or equivalent. Half course. *Dorrance*

71. Intermediate/Advanced Ballet. Greater complexity of barre and center sequences with increased emphasis on correctness of style and quality of performance. Prerequisite: Dance 70 or equivalent. Half course. *Dorrance*

72. Intermediate Jazz Dance. Prerequisite: Dance 69 or equivalent. Half course. *Childs*

79. African Dance Technique. Half course. *Davis*

80. Individual Dance Program. Half course. *Staff*

81. Repertory. The study of choreography and performance through participation in the mounting of a dance work from inception through rehearsal to performance. Consent of instructor required. Variable credit. *Staff*

Theory Courses

75. Introduction to Technical Theater. See C-L: Drama 71. One course. *Catotti*

101. Introduction to Dance. (AL) The many facets of dance, specifically dance as a theatre art. Topics include movement analysis, anthropology of dance, modern dance and ballet traditions, choreographic process, critics and dance criticism, training and life of a dancer, and dance and the other arts. The course format includes lecture, discussion, video analysis, and movement sessions. One course. *Dickinson*

129S. A History of Ballet before 1900. (AL) A history of European ballet from the time of the Renaissance dancing master through ballet d'action, the Romantic Ballet, and Petipa and classical ballet in Russia. One course. *Dickinson*

131S. Modern Dance: History and Theory I. (AL) Modern dance, through the philosophy and work of its major artists considered in relation to the other arts and the sociopolitical climate of the period 1890 to 1950. One course. *Staff*

132S. Modern Dance: History and Theory II. (AL) See 131S, but from 1950 to the present. One course. *Staff*

133. History of African-American Dance. (AL) The traditional roots of African-American dance, such as jazz and tap, and additional influences including world dance cultures. The most important pioneer and contemporary contributors to African-American dance and their role in its theatrical and concert presentation. C-L: African and Afro-American Studies 133. One course. *Staff*

135S. Dance Composition. (AL) The basic elements of movement (time, space, weight, flow) and their choreographic applications explored through structured improvisation, short movement studies, viewing of videotaped dances, and selected readings. Experimentation with devices for movement manipulation and choreographic forms through longer movement studies. Prerequisite: a beginning level dance technique course (modern, ballet, jazz, or African) or consent of instructor. One course. *Childs*

136S. Advanced Dance Composition. (AL) Continuation of the basic elements of movement, choreographic devices and forms explored in 135S. The use of props, sets, lighting and costuming; the relationship of music to dance. Choreographing and directing ensembles. Prerequisite: Dance 135S or consent of instructor. One course. *Childs*

151. Functional Anatomy for Dancers. (AL) The functional anatomy of the musculoskeletal system (muscles, bones, and joints) as specifically applied to dance technique approached through observation, analysis, and movement exploration. Concepts of efficient use and questions of misuse of the body in motion or at rest. One course. *Staff*

161. Costume Design. See C-L: Drama 161. One course. *Ma*

169S. Design: Costume, Scene, Lighting. See C-L: Drama 169S. One course. *Gallegos, Ma, and McAuliffe*

177S. Lighting. Prerequisites: Drama 71 and consent of instructor. See C-L: Drama 177S. One course. *Gallegos*

181. Special Topics. Content to be determined each semester. Consent of instructor required. One course. *Staff*

181S. Special Topics. Content to be determined each semester. Consent of instructor required. One course. *Staff*

182S. Choreography. (AL) Advanced study in dance composition designed to develop the student's personal mode of expression. Prerequisites: Dance 135S, Dance 136S, and consent of instructor. One course. *Childs, Dickinson, or Taliaferro*

186S. Stage Management. See C-L: Drama 186S. One course. *Gallegos*

188S. The Diaghilev Ballet, 1909-1929. (AL) The Diaghilev Ballet as a focal point for modernist movements in the arts and a revitalizing force for ballet that brought together choreographers Fokine, Nijinsky, Massine, Nijinska; composers Stravinsky, Ravel, Debussy, Satie; artists Bakst, Benois, Picasso, Braque. Prerequisite: junior or senior standing or consent of the instructor. C-L: Institute of the Arts 121S and Interdisciplinary Course 188S. One course. *Dickinson and staff*

189S. Dance Criticism: From Stage to Page. (AL) The theories and practicalities of how to look at and write about dance performance, ranging from ballet and modern dance to Step shows, clubs, and postmodern performance art. One course. *Staff*

191, 192. Independent Study. Individual intensive research or creative projects. Consent of instructor required. Half or one course. Variable credit. *Staff*

200. Senior Project. (AL) A research paper, project, or program (with appropriate written documentation) under dance faculty supervision. Open only to seniors earning a certificate in dance. One course. *Staff*

COURSES CURRENTLY UNSCHEDULED

65. Beginning Improvisation

130. Inter-Arts: Theory and Practice. (AL)

134. Creative Movement for Children

163. Costume Construction

164. Make-up and Masks

165. Costume Drawing and Rendering

178. Advanced Lighting Design

197. Aesthetics of Twentieth-Century Dance. (AL)

198. Sacred Dance. (AL)

Distinguished Professor Courses (DPC)

Distinguished professor courses enable students, regardless of their majors, to study with some of the most outstanding teachers and scholars within the university. The courses often focus on topics of broad intellectual and academic interest beyond the scope of a single discipline. They may count toward the appropriate distributional requirements as indicated.

188S. Great Books in Biology: Evolution, Genetics, Neurobiology. (NS) Analysis of original texts by great pioneers in biology—Darwin, Mendel, Galton, Claude Bernard, Sherrington, and others. One course. *Diamond*

189S. Building the Brain. (NS) Human brain development; implications of this process for a variety of biological, educational, and social issues. Topics include the organization of the brain into maps and modules; the role of experience in shaping neural connections; the existence of critical periods for learning the development of behavior; and the nature of aging in the brain. Recommended background: Psychology 103, Biology 154, Biology 21L and/or Biology 22L. Open only to juniors and seniors. C-L: Human Development, Neurobiology 189S, Neurosciences, and Psychology 189S. One course. *Puroes*

191. Dante's *Inferno*. (AL) A close study of the text in a bilingual edition. Attention to the historical, political, and theological aspects of the poem. Examples of use of some of the cantos by Joyce, Eliot, and Beckett. Consent of instructor required. One course. *Fowlie*

192. French Existentialism: 1940-1960. (CZ) A critical introduction to the chief positions and controversies of French existentialism. Taught in English. One course. *Mudimbe*

195. Proust, *Remembrance of Things Past*. (AL) In the three-volume translation by Kilmartin. The aesthetics of the novel in terms of its structure, characters, and social classes of France. Students who know French will be encouraged to do some of the reading in French. Consent of instructor required. One course. *Fowlie*

196. The French Symbolists and T. S. Eliot. (AL) A study of the poems and theory of Baudelaire, Mallarmé, and Rimbaud. The debt of the symbolists to Poe and their influence on Eliot. Taught in English. Bilingual texts will be used. Consent of instructor required. One course. *Fowlie*

197S. The Family in Christian History. (CZ) Ideas about and practices concerning the family, sexuality, and reproduction, from the first through the twentieth centuries of Christian history. Open to sophomores, juniors, and seniors. Consent of instructor required. C-L: Religion 190S and Women's Studies. One course. *Clark*

198S. The Discovery of the Old World: Utopias Ancient and Modern. (AL) An exploration of utopian literature as it has been generated by voyages of discovery, both ancient and modern. An examination of how such voyages have led to the rediscovery of the old world from the alien perspective of the new, beginning with the voyages of discovery of Columbus, Thomas More's *Utopia*, Montaigne's *On Cannibals*, Shakespeare's *Tempest*, and John Lawson's *A New Voyage to Carolina* (1708). Ancient utopian literature, including the *Odyssey*, Aristophanes' *Birds*, Plato's *Atlantis*, Euhemerus' *Panachaia*, Iamboulos' *Island of the Sun*, and Lucian's *True History*. One course. *Clay*

199S. The Changing Biosphere: Past, Present, and Future. (NS) Interactions between changing global environments through time. The maintenance, evolution, and extinction of biotic systems, including communities. Special emphasis on the nineteenth, twentieth, and twenty-first centuries. Consent of instructor required. C-L: Biology 199S. One course. *Billings*

202S. What It Means to Be Human. (SS) What natural and humanistic sciences, and also philosophy and theology, have to say about the distinctive character of human beings. Prerequisite: junior or senior standing. One course. *Langford*

207S. Topics in Psychobiology. (NS) The biological substrates of human behavior in health and disease. Drug abuse, alcoholism, depression, schizophrenia, and human

aggression. Films and videotapes. Student presentations; patient interviews. Prerequisites: senior standing and consent of instructor. C-L: Psychology 207S. One course. *Brodie*

222. Reading Milton. (AL) Milton's epic as a way of exploring some of the questions that have recently been asked about the humanities in general and literary studies in particular. Is the reconstruction of a perspective within which older texts can be responsibly read possible? What do you have to "know" in order to read *Paradise Lost*? What do you have to know in order to know what you have to know to read *Paradise Lost*? Obviously, *Paradise Lost* will be the center of the course, but we shall also read others of Milton's works and look into the tight little world of Milton criticism. C-L: English 222. One course. *Fish*

COURSES CURRENTLY UNSCHEDULED

193S. Handel and Bach: Music for Voice. (AL)

194S. Bach: Master of Style. (AL)

204S. Health Care Law and Policy. (SS)

Drama Program (DRA)

Professor of the Practice Riddell, *Director of the Program*; Assistant Professor of the Practice McAuliffe, *Director of Undergraduate Studies*; Professor Randall; Professors of the Practice Clum and Hobbs; Assistant Professor of the Practice Ma; Adjunct Assistant Professor of the Practice Catotti; Adjunct Professor Azenberg; Instructors Allen, Gallegos, Hemphill, Lopez-Barrantes, Morris, Storer, and West

A major is available in this program.

The program in drama seeks to educate students in the historical and creative aspects of the theater. Drama courses are designed to give majors a broad background necessary for advanced professional or scholarly work and to offer nonmajors the opportunity to deepen their understanding and appreciation of the theater. Guiding the work of the faculty is the belief that the theater is a collaborative art form that reaches out to other disciplines. Emphasis is placed on classwork, studio projects, and production opportunities. To keep students abreast of the changing nature of theater, resident professionals and visiting artists regularly hold workshops, teach classes, and participate in the production program.

INTRODUCTORY COURSES

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

51. Introduction to Theater. (AL) Aspects of theatrical production. Text analysis. Introductory survey of drama and theater of the last decade. C-L: English 94. One course. *Clum or Riddell*

64. Drama of Greece and Rome. (AL) See C-L: Classical Studies 64. One course. *Burian*

71. Introduction to Technical Theater. Fundamentals of scenic technology: theater space, tools and hardware, lighting equipment, and reading of plans. Laboratory. C-L: Dance 75. One course. *Catotti*

99S. Beginning Acting: Theory and Practice. (AL) Introduction to the art of acting, beginning with an exploration of the self and the actor's imagination. Storytelling skills; the actor's vocabulary. Analysis of given circumstances, intention and dramatic structure, based on reading and practice. Improvisation, monologues, and scene work. Reserved for first- and second-year students until the end of preregistration. Not open

to students who have taken Drama 100. One course. *Allen, Hemphill, Simons, Storer, or West*

OTHER UNDERGRADUATE COURSES

101S. Acting: Poetic Realism. (AL) Readings from Ibsen, Chekhov, Strindberg, Williams and/or O'Neill. Analysis of given circumstances, intention and dramatic structure, based on reading and practice. Use of the script as the primary source for actor choices. Prerequisites: Drama 99S and consent of instructor. One course. *Allen, McAuliffe, or Storer*

102S. Acting: Classical Drama. (AL) Introduction to acting verse drama. Emphasis on text analysis and scansion. Prerequisites: Drama 101S and consent of instructor. One course. *Allen or McAuliffe*

103S. Acting: Contemporary Drama. (AL) Introduction to acting twentieth-century drama. Examination and development of performance choices. Prerequisites: Drama 101S and consent of instructor. One course. *Allen, McAuliffe, or Storer*

105S. Voice and Speech. Vocal production and articulation. Phonetics, control, emotional response, projection, placement, and awareness of regionalisms. Consent of instructor required. One course. *Lopez-Barrantes or Morris*

107S. Movement. Applied body mechanics, tension release, breath, energy flow, relaxation, emotional response, alignment, and physical articulation. Consent of instructor required. One course. *Staff*

111S. Playwriting I. (AL) Fundamentals of writing for stage and screen. Open to sophomores, juniors, and seniors; recommended for, but not limited to, students who have taken English 100B. Prerequisites: a practical theater course (for example, acting, directing, design, stagecraft) and consent of instructor. C-L: English 107S and Film and Video. One course. *Staff*

112S. Playwriting II. (AL) Advanced projects in writing for production. Prerequisites: Drama 111S or English 107S; Drama 99S, 101S, or 181S; and consent of instructor. C-L: English 108S and Film and Video. One course. *Staff*

114S. Mime. (AL) Elementary mime technique utilizing methods developed by Decroux, Barrault, Marceau, and Le Coq; study of film pantomimists; final production. One course. *Staff*

115, 116. Shakespeare. (AL) See C-L: English 143, 144; also C-L: Medieval and Renaissance Studies. One course each. *DeNeef, Gopen, Jones, Porter, Randall, or Valbuena*

117S. Commedia dell' Arte. (AL) Origin, development, and legacy traced through slides, film, group games, exercises, and improvisations. Production of Goldoni's *Pinocchio*. One course. *Staff*

120. Twentieth-Century American Drama. (AL) See C-L: English 162. One course. *Clum*

121. Modern British Drama. (AL) See C-L: English 133. One course. *Clum or Moses*

124S. The Contemporary Theater. (AL) Issues in contemporary United States and world theater: artistic, economic, organizational, and political. Emphasis on exploring current trends and practices in theater today. Prerequisite: junior standing or consent of instructor. One course. *Riddell*

125S. Twentieth-Century Women Playwrights. (AL) Stein, Hellman, Terry, Wertebaker, Egloff, Churchill, Fornes, and others. One course. *McAuliffe*

126. French Drama of the Seventeenth Century. (AL, FL) See C-L: French 148; also C-L: Medieval and Renaissance Studies. One course. *Longino*

130S. Advanced Theater Techniques. Exploration of ensemble movement and mime, improvisation, group ritual, masks, and performance pieces, eventually culminating with a production (class) created by students and instructor. Not open to students who completed Drama 49S, Group Theater Techniques. Consent of instructor required. One course. *Staff*

131S. Film and Video Theory and Practice. (AL) Prerequisite: Drama 132, English 101A, or Literature 177. See C-L: English 183S; also C-L: Institute of the Arts 115S and Film and Video. One course. *Staff*

132. Introduction to Film. (AL) See C-L: English 101A; also C-L: Film and Video. One course. *Gaines*

136. Studies in Film History. (AL) See C-L: English 185; also C-L: Film and Video and Literature 187. One course. *Clum, Gaines, or Jameson*

137. Melodrama and Soap Opera. (AL) See C-L: English 187. One course. *Clum or Gaines*

141. Production and Internship. Project work that may begin in the freshman year and extend through graduation, including practical involvement in four different areas of Drama Program productions, participation in Drama Program symposia and other program activities, successful execution of drama major guidelines, completion of an approved internship. Offered only on the pass/fail basis. (Drama majors must have completed or be completing concurrently all other drama major requirements). Prerequisite: Drama 71. No credit. *Catotti*

148S. Text and Performance. (AL) (London summer program.) See C-L: English 176S. One course. *Clum*

149S. Drama in Performance. (AL) (London summer program.) See C-L: English 134S. One course. *Clum*

151S. Drama and Theater from 1590 to 1700. (AL) Drama and theater in England, France, and Spain from Marlowe to the end of the Restoration. Plays by Shakespeare, Jonson, Webster, Ford, Farquar, Dryden, Wycherly, Congreve, Molière, Racine, Corneille, deVega, and Calderon. Scene work from each period. C-L: English 174A and Literature 173S. One course. *Clum or Randall*

152. World Theater: Realism and Modernisms. (AL) Ibsen, Strindberg, Chekhov, Shaw, Pirandello, Brecht, Lorca, and other leading modern playwrights through 1960. C-L: English 174B and Literature 174. One course. *Clum or Riddell*

154. Shakespeare and the Theater. (AL) A study of ten Shakespearean plays as blueprints for production. Shakespearean production: history and problems. Includes scene work. C-L: English 130. One course. *Clum or Randall*

161. Costume Design. Basic costume design principles and aesthetic concepts. Emphasis on presentation of design approach via sketches, collages, and swatches. Play analysis, design research, concept development, and color control leading to design solutions. Selected periods of costume history. C-L: Dance 161. One course. *Ma*

167. Asian Art and Theater. (AL) The social, philosophic, and artistic content of Asian visual arts and their relationship to theater from historical and practical points of view. One course. *Ma*

169S. Design: Costume, Scene, Lighting. Design principles for theater. Presentation of theatrical concepts via drawings and models. Projects prepared for criticism, with emphasis on play analysis, research, sketches, models, and ground plans. Focus on

collaborative processes leading to design solutions. C-L: Dance 169S. One course. *Gallegos, Ma, and McAuliffe*

171S. Advanced Stagecraft. Advanced methods and tools of scenery construction. Emphasis on welding, brazing, furniture repair. Laboratory. Prerequisites: Drama 71 and consent of instructor. One course. *Catotti*

172S. Scene Design I. Aesthetics and skills of designing scenery for theater. Emphasis on design projects and problem solving. Introduction to drawing and color. Prerequisite: Drama major standing or consent of instructor based on portfolio review. One course. *Ma*

173S. Scene Design II. Advanced applications. Prerequisite: Drama 172. One course. *Ma*

175S. Advanced Topics in Stagecraft. Problem solving of theater technology. Solutions to problems such as interior theater architectural design, stage elevator systems, and tracking. Prerequisites: Drama 71 and consent of instructor. One course. *Catotti*

177S. Lighting. History, fundamentals of electricity, instrumentation, light plots, aesthetics, and design problems. Prerequisites: Drama 71 and consent of instructor. C-L: Dance 177S. One course. *Gallegos*

181S. Directing I. (AL) Establishment of basic skills of information communication from script to stage to audience; analyzing texts from a director's point of view; basic stage articulation of viewpoint; development of skills in mechanics and staging techniques. Emphasis on scripts of poetic realists. Prerequisites: Drama 51 or 99S and consent of instructor. One course. *McAuliffe or Storer*

182S. Directing II. (AL) Examination of rehearsal working methods and development of performance choices with emphasis on modern and contemporary scripts. Includes practicum with actors. Prerequisites: Drama 181S and consent of instructor. One course. *McAuliffe*

183S. Directing III. (AL) Examination of rehearsal working methods and development of performance choices with emphasis on modern and contemporary scripts. Includes practicum with actors. Prerequisites: Drama 182S and consent of instructor. One course. *McAuliffe*

185S. Theater Administration. History and principles of running the theater and managing the production. Emphasis on theater organization, theater types (commercial, not-for-profit, regional), and involvement with other entities (unions, investors, philanthropic bodies). One course. *Gallegos*

186S. Stage Management. Fundamentals: methods and procedures of rehearsal and performance organization. Project experience. Preparation of production books, rehearsal and performance logs. In the context of the American professional theater. C-L: Dance 186S. One course. *Gallegos*

187. Broadway Production. Aspects of producing Broadway shows, from script-selection to final production, and including marketing techniques. Half course. *Azenberg*

191, 192, 193, 194. Independent Study. Individual intensive research or creative projects. Half or one course. Consent of instructor required. Variable credit. *Staff*

195, 196. Special Topics. Illustrative examples: specific writers or other theater artists, media studies, styles, mime, masks, clowns, stage fighting, newspaper criticism, studies of the profession, audition techniques, and theater periods. May be taken more than once. Half course, one course, respectively. *Staff*

195S, 196S. **Special Topics.** Seminar versions of Drama 195 and 196. May be taken more than once. Half course, one course, respectively. *Staff*

197S. **Special Topics in Film.** (AL) Prerequisite: Drama 132 or English 101A. See C-L: English 189S; also C-L: Film and Video. One course. *Clum, Gaines, or Moses*

220S. **German Theater as Anti-Drama.** (AL, FL) See C-L: German 233S. One course. *Alt*

225. **Renaissance Drama: 1500 to 1642.** (AL) See C-L: English 225; also C-L: Medieval and Renaissance Studies. One course. *Randall*

COURSES CURRENTLY UNSCHEDULED

109S. **Acting for Camera**

110. **Inter-Arts: Theory and Practice.** (AL)

113S. **Screenwriting.** (AL)

118. **Absurdist and Postmodern Drama.** (AL)

122. **French Comedy.** (AL, FL)

123. **French Drama of the Twentieth Century.** (AL, FL)

135. **Narrative Film and the Novel.** (AL)

138. **American Film Genres.** (AL)

139. **Television, Technology, and Culture.** (AL)

145S. **Theater Farce.** (AL)

162. **Costume Techniques**

163. **Costume Construction**

164. **Make-up and Masks**

165. **Costume Drawing and Rendering**

166. **Costume History.** (CZ)

174. **Drafting for the Theater**

176. **Scene Painting**

178. **Advanced Lighting Design**

THE MAJOR

The major in drama offers students a grounding in (1) the history of theater and dramatic literature, and (2) the interrelated disciplines of the art of theater, for example, acting, design, directing, playwriting, and technical production. Students completing the major will be prepared for either graduate study, advanced theater training, or entry-level work in the profession.

Prerequisites: Drama 51, 71, and 99S.

Requirements: Drama 151S,* 152,* 181S; 161, 169, or 172; 141; plus three additional 100-level courses in the program.

*Drama 151S or 152 may be replaced by Drama 148S or Drama 149S, taught during the summer in the London Program.

Ecology

For courses in ecology, see Biology, Environment (School), and Environmental Sciences and Policy Program.

Economics (ECO)

Professor De Marchi, *Chair*; Professor Tower, *Director of Undergraduate Studies*; Professors Clotfelter, Cook, Goodwin, Grabowski, Graham, Havrilesky, Kelley, Kimbrough, Ladd, McElroy, Moulin, Sloan, Tauchen, Treml, Vernon, Viscusi, Wallace, Weintraub, and Yohe; Associate Professors Conrad, Kramer, Leitzel, and Marshall; Assistant Professors An, Bansal, Baumgardner, Gentry, Hamilton, Meurer, and Yang; Professors Emeriti Blackburn, Bronfenbrenner, and Kreps; Research Professors Burmeister and Coats; Adjunct Professor Gallant; Adjunct Associate Professor Zarkin; Visiting Assistant Professors Coleman and Ramachandran

A major is available in this department.

Economics courses develop the critical and analytical skills essential for understanding economic problems and institutions, in both their contemporary and historical settings. Although no particular vocational or professional goal is emphasized, these courses provide the academic background necessary for positions in industry, for work in many branches of government service, for law school, and for graduate study in business administration, economics, and the social sciences.

Students planning to do graduate work in economics are advised to take as many of the following courses in mathematics (listed in preferential order) as their schedules permit: Mathematics 31, 32, 103, 104, 131, 135, and 136.

1D. National Income and Public Policy. (SS) Basic economic analysis emphasizing current public policy issues. Means of determining the level and rate of growth of aggregate national income and output. Causes of unemployment, inflation, and international payment problems. The effects of monetary policy (money supply and interest rates) and fiscal policy (government expenditures and taxes) on these problems. For freshmen; upperclassmen only by consent of instructor. One course. *Staff*

2D. Competition, Monopoly, and Welfare. (SS) The composition of output and the distribution of income in a market economy. Role of government. Contemporary problems. Topics such as environmental economics, monopoly, unionism, international trade. Comparison of a market economy with other systems of economic organization. Economic problems of developing countries. Open only to freshmen. One course. *Staff*

2S. Competition, Monopoly, and Welfare. (SS) Seminar version of Economics 2D. Open only to freshmen. Consent of instructor required. One course. *Weintraub*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

51D. National Income and Public Policy. (SS) For description see Economics 1D. Open to all students. May be taken before or after Economics 2D or 52D. One course. *Staff*

52D. Competition, Monopoly, and Welfare. (SS) For description see Economics 2D. Open to all students. May be taken before or after Economics 1D or 51D. One course. *Staff*

53. Economics of Contemporary Issues. (SS) Modern economic problems, such as environmental deterioration and urban decay. The market as one of the interrelated subsystems of the social system, from institutionalist, Marxist, and other perspectives in the social sciences. One course. *Staff*

60. Economics of a United Europe. (SS) The impact of common European monetary policy; implications of common welfare standards for the competitiveness of the countries on the periphery, such as Spain and Portugal; unemployment problems and migration issues. Available only in the Duke in Berlin Fall Program. One course. *Staff*

65. Japanese Business Management. (SS) Topics include production, labor management, finance, and accounting. Classroom lectures and discussions supplemented by several field trips. (Taught in Japan.) One course. *Fukuda*

69. Australia and the Asia-Pacific Economies. (SS) Economic growth, development, immigration, foreign investment, deregulation, privatization, tax reform, and financial liberalization in Australia and the Asia-Pacific. ASEAN. Available only in the Duke-in-Australia Program. C-L: Comparative Area Studies. One course. *Lodewijks*

98. Introduction to Canada. (SS) Does not count for economics major requirements. See C-L: Interdisciplinary Course 98; also C-L: Canadian Studies, History 98, Political Science 98, and Sociology 98. One course. *Leclerc or Thompson*

108. Economics of War. (SS) Conflict theory, causes and economic consequences of war, military personnel, military-industrial complex, disarmament, and the economy. Prerequisite: Economics 2D or 52D. One course. *Weintraub*

130. The Changing Role of the Market in the Social System. (SS) Comparison of the different perspectives on the role of the market in the social system, from libertarian to Marxian. Application of the tools of analysis of market behavior to seemingly noneconomic problems such as crime and environmental decay. Prerequisites: Economics 1D or 51D, and 2D or 52D. One course. *Havrilesky*

133. The Evolution of the American Economy. (SS) The process of industrialization and modernization in the United States from the pre-Civil War period to the present. Prerequisites: Economics 1D or 51D, and 2D or 2S or 52D. One course. *Coats*

134. Japanese Economy and Its History. (SS) Japanese economic development since the end of isolation, in the mid-nineteenth century. Prerequisite: one course in economics or Far Eastern history. One course. *Bronfenbrenner*

139. Introduction to Econometrics. (QR) Data collection, estimation, and hypothesis testing. Use of econometric models for analysis and policy. Prerequisites: Economics 2D or 2S or 52D, Mathematics 32 or equivalent, and statistics. One course. *Marshall, McElroy, Tauchen, or Wallace*

140. Comparative Economic Systems. (SS) A strategic analysis of the new economics of the Soviet Union, China, and Eastern Europe as well as the socioeconomic, political systems of the United States, Japan, Sweden, and other capitalistic countries. Prerequisites: Economics 1D or 51D, and 2D or 2S or 52D. C-L: Comparative Area Studies. One course. *Staff*

141. Alternative Economic Systems. (SS) Alternatives to traditional capitalistic free-market economic systems including nontraditional systems such as Marxian economics, communism, radical economics, and democratic socialism. Prerequisites: Economics 1D or 51D and Economics 2D or 2S or 52D. One course. *Staff*

142S. Chinese Economy in Transition. (SS) Evolution of the Chinese economy since 1949. Exposition of alternative economic systems, the commune, incentive problems and state enterprises. Analysis of recent reforms and their effects on economic efficiency: agricultural growth, changes in ownership structures, financial markets, reforms and inflation, privatization, gradualism and shock treatment. Through a research project students develop expertise in one aspect of the Chinese economy. Prerequisites: Economics 1D or 51D, and 2D or 2S or 52D. One course. *Yang*

144. Education, Development, and Growth. (SS) The basic elements of human capital theory and its application to economic growth and development. Topics include human capital investment, life-cycle earnings, impact of education on farm efficiency, migration, national income accounting, and models of endogenous growth. Data from the United States and other countries used to test theoretical implications. Prerequisites: Economics 149, Economics 154, and Statistics 110B. One course. *Yang*

145. The Soviet Economy and Its Collapse. (SS) Historical development and structure of command-administrative system. Gorbachev's perestroika. The transition from plan to market. One course. *Staff*

149. Microeconomic Theory. (SS) Cost and supply considerations in price theory; the demand for factors of production. The allocation of resources in the context of competitive and monopolistic market structures. Not open to students who have had Public Policy Studies 110. Prerequisites: Economics 2D or 2S or 52D, and Mathematics 31. One course. *Baumgardner, Graham, McElroy, Tower, Trembl, Vernon, or Wallace*

150. History of Economic Thought. (SS) Approaches to economic problems from Aristotle to Keynes, emphasizing certain models and doctrines—their origins, relevance, and evolution. Readings from Mun, Quesnay, Adam Smith, Malthus, Ricardo, Marx, Walras, Veblen, and Keynes. Prerequisites: Economics 1D or 51D, and 2D or 2S or 52D. C-L: Comparative Area Studies. One course. *De Marchi or Goodwin*

151. Adam Smith and the System of Natural Liberty. (SS) The writings of Adam Smith, including close readings of *The Wealth of Nations* and *The Theory of Moral Sentiments*. Focus on the natural and social context of late eighteenth-century economic ideas, connections with earlier and later thinkers, including Quesnay, Ricardo, Mill, and Marx. C-L: Comparative Area Studies. One course. *De Marchi*

152. Mercantile Culture and Art in the Netherlands. (CZ) See C-L: Art 155. One course. *De Marchi and Van Miegroet*

153. Monetary Economics. (SS) The evolution and operations of commercial and central banking and nonbanking financial institutions in the United States, the determination of monetary aggregates and interest rates, the financial impacts of Treasury operations, and the linkages from Federal Reserve actions to price level, employment, economic growth, and balance of payments objectives. Prerequisite: Economics 154. One course. *Havrilesky or Yohe*

154. Aggregate Economics. (SS) Concepts and measurement of national income and expenditures, employment, interest rates, and price levels; the theoretical determination of these aggregates; applications of macroeconomic theory to business cycles and economic growth. Prerequisites: Economics 1D or 51D, 2D or 2S or 52D, and Mathematics 31. One course. *De Marchi, Havrilesky, Kimbrough, Tauchen, Tower, or Yohe*

155S. Labor Economics: Analysis and Measurement. (SS) Labor market equilibria. The demand for labor. The supply of labor: human fertility, human capital, hours of work, and labor force participation. Wage levels and differences. Union and government as labor market factors. Prerequisites: Economics 149, Mathematics 31, and statistics. One course. *Baumgardner or staff*

156. Health Economics. (SS) Economic aspects of the production, distribution, and organization of health care services, such as measuring output, structure of markets, demand for services, supply of services, pricing of services, cost of care, financing mechanisms, and their impact on the relevant markets. Prerequisite: Economics 149. One course. *Baumgardner or Sloan*

157S. Business Cycles and Economic Forecasting. (SS) Causes of fluctuations in economic activity and conventional methods of forecasting micro- and macroeconomic

variables, using microcomputer programs. Forecasting projects by students. Prerequisites: Economics 149, 154, and statistics. One course. *Yohe*

158. Financial Markets and Investments. (SS) The tools learned in microeconomics, macroeconomics, basic mathematics, and statistics applied to problems in financial economics. A blend of pure economic theory, an investigation of financial data, and practical applications using personal computers. Prerequisites: Economics 149, Economics 154, and a statistics course—preferably Statistics 110B or 210B. One course. *Burmeister*

160. Nonrenewable Resource Economics and Public Policy. (SS) Prerequisite: Economics 149. See C-L: Public Policy Studies 160. One course. *Conrad*

161S. Economics of Slavery in the American South. (SS) Examines how modern economic analysis is helpful in understanding the nature and development of a slave economy, society, and culture. Combines the study of economic development and comparative economic systems. Prerequisite: Economics 149. C-L: African and Afro-American Studies 161S and History 140S. One course. *Coats*

165. American International Economic Policy. (SS) Topics include United States trade policies and protectionism, the North American Free Trade area, trade and economic relations with industrialized countries, policies toward developing countries and multilateral institutions, macroeconomic policy coordination, and relations with Europe. Prerequisites: Economics 1D or 51D and 2D or 2S or 52D. C-L: Public Policy Studies 165. One course. *Staff*

171. Behavioral and Experimental Economics. (SS) The relationship between actual behavior and economic models. Topics include individual decision-making behavior, game theory, and the role of market institutions. The interaction of economic and psychological theory. Students have the opportunity to participate in, and conduct, economic experiments. Prerequisite: Economics 149 or consent of instructor. One course. *Staff*

173. Economics of Organization and Management. (SS) Coordination and motivation issues within a corporation along with the internal design and dynamics of organizations. Topics include the structure of employment contracts, performance incentives, and the pricing of financial assets. Prerequisite: Economics 149. One course. *Marshall or Meurer*

180. Law and Economics. (SS) An introduction to the economic analysis of legal issues and legal reasoning. Case studies in accident law, product liability, and the value of life. Other topics include contracts, property, affirmative action, civil procedure, and the economics of criminal behavior. Prerequisite: Economics 149. One course. *Viscusi*

181. Corporate Finance. (SS) Major corporate decisions from the perspective of the firm with an emphasis on the interaction of the firm with financial markets: project evaluation for investment, choice between borrowing and issuing stock, dividend policy, organizational form (for example, mergers and acquisitions). Introduction to financial markets: issuing stocks, analyzing financial performance, and options. Prerequisites: Economics 1D or 51D, 2D or 52D; and some statistics recommended. One course. *Coleman or Gentry*

184S. Canadian Issues. (SS) Does not count for economics major requirements. Prerequisite: Interdisciplinary Course 98 or consent of instructor. See C-L: Interdisciplinary Course 184S; also C-L: Canadian Studies, Comparative Area Studies, Cultural Anthropology 184S, History 184S, Political Science 184S, and Sociology 184S. One course. *Staff*

187. Public Finance. (SS) Economic aspects of the allocative and distributive role of government in the economy, the incidence and efficiency of taxation, the effects of

taxation on behavior, and analysis of major government spending programs. Prerequisite: Economics 149. One course. *Gentry*

188. Industrial Organization. (SS) Economic theories of the behavior of firms within industries. Emphasis upon incentives and the role of information when firms are mutually interdependent. Topics include the agency problem, entry, research and development, collusion, and various pricing schemes. Analysis conducted within a number of regulatory environments. Prerequisites: Economics 149 and statistics, or consent of instructor. One course. *Marshall or Meurer*

189. Business and Government. (SS) Public policies which most directly affect the operation of competition in the business world. The economic basis for an evaluation of antitrust policy, public utility regulation, and public enterprise. Prerequisites: Economics 149 and statistics, or consent of instructor. One course. *Grabowski or Vernon*

191, 192. Independent Study. Directed reading and research. Consent of instructor and Director of Undergraduate Studies required. One course each. *Staff*

193, 194. Independent Study. Same as Economics 191, 192, but for seniors. One course each. *Staff*

For Advanced Undergraduates and Graduates

205S. Advanced Monetary Theory and Policy. (SS) The theory of monetary policy from Keynesian, neoclassical and classical perspectives. Public choice and political economy approaches to monetary policy. The term structure interest rates. Portfolio theory. The theory of the financial services firm. Theories of financial regulatory policy. Prerequisites: Economics 153 and Statistics 10D. One course. *Havrilesky*

207. Models of Conflict and Cooperation. (SS) Cooperative and noncooperative game theory with applications to trading, imperfect competition, cost allocation, and voting. Prerequisites: Economics 149 and Mathematics 31. One course. *Moulin*

207S. Models of Conflict and Cooperation. (SS) Seminar version of 207. Prerequisites: Economics 149 and Mathematics 31. One course. *Moulin*

208S. Economics of the Family. (SS) Economic functions of families including home production gains from marriage, the demand for children, marriage and divorce, child support and alimony, labor supplies of women and men, the distribution of resources within families ("rotten kid theorems" and cooperative and noncooperative games). Applications to marriage and divorce law, day care, U.S. welfare policy, mortality, and farm efficiency in developing nations. Prerequisites: Economics 149 and Statistics. One course. *McElroy*

215S. Applied Cost Benefit Analysis. (SS) The principles of economic cost benefit analysis applicable to circumstances in which market valuations do not provide adequate measures of social desirability. Socially relevant prices for labor, capital, energy, materials, foreign exchange, and valuation of public goods. Development of analysis for individual projects, extended to cover economic policies. Prerequisite: Economics 149. One course. *Staff*

216S. Economics of Education. (SS) Topics include investment in human capital, return to and demand for education, the production function for schooling, public expenditures on schools, effectiveness of private and public schools, the distribution of public educational expenditures, public financing of higher education, inflation in college costs, and labor markets for teachers and professors. Emphasis on students' research projects. Prerequisite: Economics 149 or Public Policy Studies 110. C-L: Public Policy Studies 216S. One course. *Clotfelter*

218. Macroeconomic Policy. (SS) Does not count for undergraduate economics major requirements. See C-L: Public Policy Studies 218. One course. *Leitzel or McElroy*

219S. Economic Problems of Underdeveloped Areas. (SS) Analysis of underdeveloped countries with attention to national and international programs designed to accelerate development. Prerequisite: Economics 149 or consent of instructor. C-L: Comparative Area Studies. One course. *Kelley or Wallace*

220S. Computer Modeling for Policy Analysis. (SS) Introduction to the use of computer techniques in economic policy evaluation; policy applications to international economics, public finance and development economics; computer analysis of linearized and nonlinear models. Students required to complete a major modeling project. Prerequisites: Economics 149 and Economics 154. One course. *Tower*

225S. Games and Information. (SS) Non-cooperative game theory with emphasis upon incomplete/imperfect information and incentive contracting. Applications to insurance (deductibles, coinsurance), labor (piece rates, sharecropping, profit sharing), real estate (commission sales), and law (contingent contracts). Prerequisites: Economics 149 and statistics. One course. *Graham*

232. Microeconomics: Policy Applications. (SS) Does not count for undergraduate economics major requirements. See C-L: Public Policy Studies 232. One course. *Conrad or Ladd*

234. Japanese Economy and Its History. (SS) Japanese economic development since the end of isolation, in the mid-nineteenth century. Not open to students who have had Economics 134. Prerequisite: one course in economics or Far Eastern history. One course. *Bronfenbrenner*

239. Introduction to Econometrics. (QR) Data collection, estimation, and hypothesis testing. Use of econometric models for analysis and policy. (Same as Economics 139 but requires additional term paper; not open to students who have taken Economics 139.) Prerequisites: Economics 2D or 2S or 52D and Mathematics 32 or equivalent and Statistics 10D or equivalent. One course. *McElroy, Tauchen, or Wallace*

240. Comparative Economic Systems. (SS) Analysis and comparison of basic economic systems; market versus centrally planned economies; decision making, information, property rights (income and control), and incentives. Western industrialized market economies compared with Soviet-type command economies. Analysis of change, reforms, and of economic problems of systems transformation. Not open to students who have taken Economics 140. Prerequisites: Economics 1D or 51D, and 2D or 2S or 52D. C-L: Comparative Area Studies. One course. *Tremi*

242S. Chinese Economy in Transition. (SS) Evolution of the Chinese economy since 1949. Exposition of alternative economic systems, the commune, incentive problems and state enterprises. Analysis of recent reforms and their effects on economic efficiency: agricultural growth, changes in ownership structures, financial markets, reforms and inflation, privatization, gradualism and shock treatment. Through a research project students develop expertise in one aspect of the Chinese economy. (Same as Economics 142S but requires additional paper; not open to students who have taken Economics 142 or 142S.) Prerequisites: Economics 1D or 51D, and 2D or 2S or 52D. One course. *Yang*

244. Education, Development, and Growth. (SS) The basic elements of human capital theory and its application to economic growth and development. Topics include human capital investment, life-cycle earnings, impact of education on farm efficiency, migration, national income accounting, and models of endogenous growth. Data from the United States and other countries are used to test theoretical implications. (Same as Economics 144 but requires additional work; not open to students who have taken

Economics 144.) Prerequisites: Economics 149, Economics 154, and Statistics 110B. One course. *Yang*

249. Microeconomics. (SS) Cost and supply considerations in price theory; the demand for factors of production. The allocation of resources in the context of competitive and monopolistic market structures. (Similar to Economics 149 but at a more advanced level; not open to students who have taken Economics 149.) One course. *Staff*

250S. Modern Economic Thought. (SS) Selective survey of themes in economic thinking since 1936, including the role of empirical work and of formalization. Prerequisites: Economics 149, 154, and Statistics 10D or consent of instructor. One course. *De Marchi or Weintraub*

251S. Regulation of Vice and Substance Abuse. (SS) Prerequisite: Economics 149 or Public Policy Studies 110. See C-L: Public Policy Studies 251S. One course. *Cook*

253. Econometric Methods. (QR) Econometric and statistical methods for applied economic research. Topics include multivariate regression, hypothesis testing, mean square error criteria, and related subjects. Prerequisites: Economics 139 or 239, Economics 149, or equivalents. Calculus and matrix algebra recommended. One course. *Wallace*

254. Macroeconomics. (SS) Concepts and measurement of national income and expenditures, employment, interest rates, and price levels; the theoretical determination of these aggregates; applications of macroeconomic theory to business cycles and economic growth. (Similar to Economics 154 but at a more advanced level; not open to students who have taken Economics 154.) One course. *Staff*

258. Financial Markets and Investments. (SS) The tools learned in microeconomics, macroeconomics, basic mathematics, and statistics applied to problems in financial economics. A blend of pure economic theory, an investigation of financial data, and practical applications using personal computers. Not open to students who have had Economics 158. Prerequisites: Economics 149, Economics 154, and a statistics course—preferably Statistics 110 or 210. One course. *Burmeister*

259S. State and Local Public Finance. (SS) Prerequisite: Public Policy Studies 217 or equivalent. See C-L: Public Policy Studies 259S. One course. *Ladd*

260. Economic Policy Analysis of Nonrenewable Resources. (SS) Prerequisite: Economics 149, Public Policy Studies 110, or Public Policy Studies 232. See C-L: Public Policy Studies 260. One course. *Conrad*

261. Evaluation of Public Expenditures. (SS) Not open to students who have taken Economics 285. See C-L: Public Policy Studies 261; also C-L: Environment 272. One course. *Conrad*

262S. Seminar in Applied Project Evaluation. (SS) Prerequisite: Economics 285 or Public Policy Studies 261. See C-L: Public Policy Studies 262S. One course. *Conrad*

265. International Trade and Finance. (SS) Fundamental principles of international economic relations. The economic basis for international specialization and trade, the economic gains from international trade and investment, the balance of payments, international finance, and the international monetary system. Prerequisites: Economics 149 and 154. C-L: Canadian Studies. One course. *Kimbrough or Tower*

266S. Current Issues in International Economics. (SS) Emphasis on individual research projects. Prerequisite: Economics 165, 265, or consent of instructor. One course. *Kimbrough or Tower*

269. Microeconomic Analysis. (SS) The basic tools for using microeconomic analysis to address practical economic problems. Topics include consumption, production,

externalities, partial equilibrium, and general equilibrium. Applications drawn from labor markets, public goods, cost/benefit analysis, and optimal taxation. The level of the course is between intermediate microeconomics (Economics 149/249) and the core Ph.D. microeconomics sequence (Economics 301/302). One course. *Yang*

270L. Resource and Environmental Economics. (SS) Includes laboratory. Prerequisite: introductory course in microeconomics. See C-L: Environment 270L; also C-L: Public Policy Studies 272L. One course. *Kramer*

271. Behavioral and Experimental Economics. (SS) The relationship between actual behavior and economic models. Topics include individual decision-making behavior, game theory, and the role of market institutions. The interaction of economic and psychological theory. Students will have the opportunity to participate in, and conduct, economic experiments. (Same as Economics 171 but requires an additional paper; not open to students who have taken Economics 171.) Prerequisite: Economics 149 or consent of instructor. One course. *Staff*

272. Economic Analysis of Resource and Environmental Policies. (SS) Prerequisite: Environment 270L or equivalent; Economics 149 recommended. See C-L: Environment 271. One course. *Staff*

273. Economics of Organization and Management. (SS) Coordination and motivation issues within a corporation along with the internal design and dynamics of organizations. Topics include the structure of employment contracts, performance incentives, and the pricing of financial assets. (Same as Economics 173 but requires additional paper; not open to students who have taken Economics 173.) Prerequisite: Economics 149. One course. *Marshall or Meurer*

280S. Fundamentals of Political Economy. (SS) See C-L: Political Science 270S. One course. *Aldrich, Bianco, or Niou*

282S. Canada. (SS) See C-L: History 282S; also C-L: Canadian Studies, Comparative Area Studies, Cultural Anthropology 282S, Interdisciplinary Course 282S, Political Science 282S, and Sociology 282S. One course. *Staff*

286S. Economic Policy-Making in Developing Countries. (SS) See C-L: Public Policy Studies 286S; also C-L: Comparative Area Studies. One course. *Conrad or Ramachandran*

287. Public Finance. (SS) Economic aspects of the allocative and distributive role of government in the economy, the incidence and efficiency of taxation, the effects of taxation on behavior, and analysis of major government spending programs. Not open to students who have had Economics 187. (Taught concurrently with Economics 187 but requires additional graduate-level work.) Prerequisite: Economics 149. One course. *Gentry*

288S. Current Issues in United States Federal Tax Policy. (SS) Evaluation of the equity and efficiency of United States tax policy. Topics include: (1) personal consumption versus income taxation and (2) restructuring the taxation of corporate income. Emphasis on the effects of taxes on savings, investment, and the international economy. Prerequisite: Economics 149 or consent of instructor. C-L: Public Policy Studies 288S. One course. *Gentry*

292S. Issues in the Transition of Economic Systems. C-L: Comparative Area Studies. One course. *Leitzel*

293. Soviet Economic History. (SS) From 1917 through the present. Foundations of the command economy—rejection of markets, central planning, industrialization, collectivization of agriculture; economic reforms and search for economic efficiency.

Gorbachev's perestroika and the dissolution of the Soviet Union. C-L: Comparative Area Studies. One course. *Trem*

294S. Soviet Economic System. (SS) Economic planning and administration in the Soviet Union. Theoretical and applied problems of resource allocation, economic development, and optimal micro decision making in a nonmarket economy. Gorbachev's perestroika, search for a new model, and the collapse of the Soviet system. C-L: Comparative Area Studies. One course. *Trem*

Honors Seminars (by invitation only)

201S, 202S. Current Issues in Economics. (SS) Economic analysis of such issues as the health care system, crime and punishment, pollution and the environment, the performing arts, welfare, and the energy crisis. Prerequisites: for 201S, Economics 149 and statistics; for 202S, Economics 201S. One course each. *Weintraub*

206S. Regulation and Industrial Economics. (SS) Analysis of industrial competition and performance in industries such as automobiles, telephones, cable TV, airlines, pharmaceuticals, tobacco, and health care services. Analysis of the efficiency of regulation and other public policy programs. Prerequisites: Economics 149 and statistics. One course. *Grabowski*

209S. Economics of Population. (SS) Relationship of population growth to economic development and to natural resource and environmental pressures. Causes and impacts of population change, including economic models of fertility, mortality, marriage, and migration. Prerequisites: Economics 149 and 154. One course. *Kelley*

212S. Economic Science and Economic Policy. (SS) An historical and contemporary examination of the impact of economics on public policy. Topics vary each semester and have included energy and anti-inflationary policy, productivity growth, the Third World, and the Council of Economic Advisers. Different sources of economic ideas in the policy process. Prerequisites: Economics 149, 154, and consent of instructor. One course. *Goodwin*

COURSES CURRENTLY UNSCHEDULED

132. Introduction to Economic History. (SS)

169, 170. Microeconomic Analysis I and II. (SS)

198S. Economics of Regulation. (SS)

203S. Mathematical Economics. (SS)

211S. Current Problems in Aggregate Supply. (SS)

224S. Economics of the Law. (SS)

231S. Economic Development in Latin America. (SS)

235. The Economics of Crime. (SS)

THE MAJOR

Prerequisites. Mathematics 31, Economics 1D or 51D, and Economics 2D or 2S or 52D, and an approved statistics course. The best statistics course for most economics majors is Statistics 110B. (Statistics courses currently acceptable include Psychology 117, Public Policy Studies 112, Sociology 133, and Statistics 110B, 112, 114, 210B, 213, and 215.)

Major Requirements. Economics 149, 154, and any three additional 100- or 200-level courses. Substitution of similar courses in other departments for courses in the economics department will not be permitted.

Honors/Distinction

For graduation with departmental distinction at least one honors seminar and an honors paper are required. Prerequisites for admission to an honors seminar, upon invitation to take such a seminar extended by the director of the Honors Program (Professor Goodwin), are two of the following courses: Economics 149, 154, and an approved statistics course. For Latin honors by honors project the student must meet the same grade point average requirements as for graduation with distinction, take an approved 200-level course in economics and complete a research paper of quality meriting Latin honors. The proposed program of research must be approved in advance by the faculty sponsor and the director of the Honors Program. See the section on honors in this bulletin.

Education Program (EDU)

Professor of the Practice Davis, *Chair and Director of Undergraduate Studies*; Professor Page; Associate Professors Ballantyne, Di Bona, and Sawyer; Professors of the Practice Beckum and Carbone; Assistant Professor of the Practice Malone; Adjunct Professors Friedrick and Phillips; Adjunct Associate Professor Martin; Adjunct Assistant Professors Bryant and Wilson; Adjunct Assistant Professors of the Practice Lattimore and Teasley; Lecturers Bookman and Riggsbee; Adjunct Lecturer Smith; Senior Lecturing Fellow Sasson

Students who desire an understanding of the study of education as part of their liberal arts program should elect courses in accordance with their special interests. Selected courses in education may satisfy requirements in the social sciences area of knowledge. Students who expect to teach should confer with an advisor in the program prior to registration each semester. Students interested in certification to teach in secondary schools should consult Professor Malone, director of teacher preparation. Students interested in certification to teach in elementary schools should consult the elementary schools coordinator, Ms. Riggsbee.

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

100. Social and Philosophical Foundations of Education. (SS) Basic features and assumptions, viewpoints, and issues of education in contemporary America. One course. *Carbone or Di Bona*

108S. Teaching Practices in Elementary Language Arts and Content Areas. (SS) Research, theories, and practices of language arts, social studies, science, and mathematics instruction in the elementary school. Introduction to appropriate strategies and methodologies that reflect proven educational practices and research. A planned, sequential field-based experience in a model public school is provided. One course. *Riggsbee*

109S. Elementary Curriculum. Seminar in curriculum development. Principles, practices, and problems of instruction. For student teachers only. One course. *Bryant*

117S. Psychology of Personal and Social Adjustment. (SS) Principles of mental health affecting individual and social adjustments. One course. *Malone*

118. Educational Psychology. (SS) Emotional and cognitive learning in children, youth, and adults. One course. *Ballantyne, Davis, Malone, or Page*

120. Elementary Education: Internship. Supervised internship in a teaching center in an elementary school, involving full-time teaching. For student teachers only. Pass/fail grading only. Two courses. *Riggsbee*

121. Infancy, Early Childhood, and Educational Programs. (SS) Developmental theories and their practical application in education. Emphasis on parenting and teaching. One course. *Riggsbee*

139. Marxism and Society. (SS) Core course for the Program in Perspectives on Marxism and Society. See C-L: Cultural Anthropology 139; also C-L: Comparative Area Studies, History 186, Interdisciplinary Course 139, Literature 139, and Sociology 139. One course. *Staff*

140. The Psychology of Work. (SS) Factors affecting career choice and change. One course. *Ballantyne*

149S. Exceptional Children. (SS) Etiology and assessment of major types of exceptionalities, including intellectual abilities, physical or emotional handicaps, and sensorially impaired. Family relationships and treatment programs. One course. *Davis*

155S. Tests and Measurements. (SS) Measuring abilities, achievement, and personality. Analysis, criticism, and construction of tests for admission, classroom, and society. One course. *Page*

170, A-O. Selected Topics. One course. *Staff*

189S. The Teaching of Composition, Grammar, and Literature in Secondary School. Includes field-based experiences with local schools. See C-L: English 118S; also C-L: Linguistics. One course. *Staff*

191, 192. Independent Study. Directed reading and research for juniors. Consent of instructor and director of undergraduate studies required. One course each. *Staff*

193, 194. Independent Study. Directed reading and research for seniors. Consent of instructor and director of undergraduate studies required. One course each. *Staff*

For Seniors and Graduates

205, 206. Selected Topics. One course each. *Staff*

210S. Higher Education in Latin America. (SS) An interdisciplinary and comparative approach to the issues and problems of higher education in the context of contemporary society. One course. *Di Bona*

215S. Seminar in Secondary School Teaching. Principles, practices, and problems in secondary school instruction. One course. *Carbone or staff*

216. Secondary Education: Internship. Supervised internship in a teaching center in a senior high school involving some full-time teaching. For student teachers only. Two courses. *Bookman, Carbone, Smith, Teasley, or staff*

225. Teaching of History and the Social Studies. Evaluation of the objectives, content, materials, and methods in the teaching of history and the social studies. Includes field-based experiences with local schools. One course. *Wilson*

232. Learning and Living in Families. Role and function of the family as related to the development and behavior of its members, to gender identification, to parenting, and to interactions among family members. One course. *Ballantyne or Davis*

236S. Teaching Developmental and Remedial Reading in the Secondary School. Principles and methods for the development of effective reading and learning strategies in the high school classroom. Includes field-based experiences with local schools. One course. *Malone*

242S. Group Interactions. Examination of theoretical issues and processes involved in the dynamics of, and learning in, small groups of children, adolescents, parents, other adults, with attention to problem-oriented groups. One course. *Ballantyne*

246. Teaching of Mathematics. Aims, curriculum, and classroom procedure for teaching secondary school mathematics. Includes field-based experiences with local schools. One course. *Bookman*

276. Teaching of High School Science. Discussion, lectures, and collateral reading related to such topics as aims, tests, curriculum, classroom and laboratory procedures, field trips, and course and lesson planning for secondary school science. Includes field-based experiences with local schools. One course. *Smith*

COURSES CURRENTLY UNSCHEDULED

103S. American Educational Theory. (SS)

168S. Contemporary Education Criticism. (SS)

171T, 172T. Junior-Senior Tutorials

173, 174. Clinical Reading Practicum

211. Education and the Mass Media. (SS)

212S. Pedagogy and Political Economy: A World View. (SS)

227. Contemporary Theories of Counseling and Psychotherapy. (SS)

248. Practicum in Counseling

UNIVERSITY PROGRAM FOR PREPARATION FOR TEACHING*

Duke University offers programs to prepare students to become certified teachers in elementary and secondary schools. As students complete requirements of Trinity College and of a selected major they may also fulfill requirements of the approved Teacher Preparation Program and become certified to teach. Certification by the Duke approved program is authorized through the State Board of Education in North Carolina and is reciprocal with most states. A certificate to teach along with an undergraduate degree is required by most public school systems and is recommended by many independent schools.

Brief descriptions of two undergraduate programs based on Bachelor of Arts or Bachelor of Science degrees (secondary school teaching and elementary teaching) are followed by a description of a program for secondary teaching based on a Master of Arts in Teaching degree. The goals of and criteria for admission to any of these programs are available from the respective offices.

Secondary School Teaching (A.B. or B.S. degree)

Students who are majors in the departments of English or mathematics may become eligible to be certified in their fields. Majors in biology, chemistry, geology, or physics may become eligible to be certified to teach high school science. Majors in cultural anthropology, economics, history, political science, psychology, public policy, religion, or sociology are eligible to be certified to teach social studies. Prospective teachers are

*Duke University is accredited by the North Carolina Department of Public Instruction and the National Council for Accreditation of Teacher Education (NCATE), and has reciprocal approval for initial certification with most of the fifty states.

advised to consult with their major academic advisors and the Director of Teacher Preparation concerning their interest in teaching and in being accepted into the preparation program.

Interested undergraduate students may apply to the Secondary School Teaching Program in the spring of their sophomore year or the fall of their junior year. Students are accepted by competitive criteria into a program which includes education courses with field experiences in schools, and an intensive senior spring semester internship. During the internship students teach high school classes in their respective disciplines under the supervision of an experienced master teacher and a university professor.

Upon completion of the senior year spring internship semester, and upon completion of the four-year Trinity College undergraduate degree, students may apply for certification to teach in their academic field in a secondary school.

Elementary Teaching (A.B. or B.S. degree)

Undergraduate students who have the desire to teach young children (usually kindergarten through grade six) may qualify for a teaching certificate while at Duke in addition to completing any academic major offered by Trinity College. The Elementary Program includes academic course work and an intensive senior fall semester internship.

Interested undergraduate students should apply to the Elementary Program in the fall of the junior year. Students are selected by competitive criteria for participation in an intensive senior fall semester which links together a teaching internship in a model school, seminars, and independent directed research (four course credits). Students selected for the public elementary teaching certificate program are placed as interns with master teachers in a public elementary school and supervised by a Duke professor on a one-to-one basis. Duke student interns begin their internship with the master teacher during preservice days before classes for children begin.

Upon completion of the senior year fall semester internship and the four-year Trinity College undergraduate degree, students may apply for elementary teaching certification.

Master of Arts in Teaching (MAT) in Secondary Schools

The Master of Arts in Teaching Program is designed for students who wish to teach their discipline in secondary schools by completing a graduate degree. Entry into the MAT Program is targeted for the second semester of the student's senior year. The normal sequence for MAT course work may begin in the spring semester of the senior year. Courses may not be double-counted toward both the bachelor's and MAT degrees. Additional information is available from the Office of the Dean of the Graduate School. This program is approved for teacher certification by the State Board of Education in North Carolina and is reciprocal with most states.

English (ENG)

Professor Jackson, *Chair*; Professor Butters, *Associate Chair*; Associate Professor Gerber, *Director of Undergraduate Studies*; Professor of the Practice Gopen, *Supervisor of Freshman Instruction and Director of University Writing Program*; Professors Applewhite, Clum, C. Davidson, DeNeef, Fish, Gleckner, Holloway, F. Lentricchia, Price, Randall, Ryals, Sedgwick, B. H. Smith, Strandberg, Tompkins, Torgovnick, and K. Williams; Associate Professors Gaines, Jones, Mellown, Moon, Pope, Porter, Schwartz, and Willis; Assistant Professors Ferraro, Moses, Pfau, and Tetel; Assistant Professors of the Practice Cox, Hillard, and M. Lentricchia; Assistant Research Professor Chandler; Adjunct Professor A. Davidson; Adjunct Associate Professors Hill and Ruderman; Adjunct Assistant Professors DeLong, Kennedy, Sasson, and Wittig; Visiting Assistant Professor Valbuena; Lecturer Thorn; Visiting Instructor Woodruff

A major is available in this department.

WRITING AND LANGUAGE

For courses in composition see below and also University Writing Courses 3, 4, 5, 6, 7, 8, and 12 in the University Writing Program section of this bulletin.

27S. Studies in Nonliterary Topics. May be taken twice. One course. *Staff*

28S. Introduction to Creative Writing. (AL) Consent of instructor required. One course. *Staff*

29. Composition and Language. Credit for advanced placement on the basis of the College Board examination in composition and language. One course.

100A, S. Writing: Fiction. (AL) Instruction in the writing and study of fiction. Recommended for students before they take English 103S, 104S, 110S, 202S, or 203S. Consent of instructor required. One course. *Staff*

100B, S. Writing: Drama. (AL) Instruction in the writing and study of drama. Recommended for students before they take English 102S or 107S. Consent of instructor required. One course. *Staff*

100C, S. Writing: Poetry. (AL) Instruction in the writing and study of poetry. Recommended for students before they take English 105S or 106S. Consent of instructor required. One course. *Staff*

103S, 104S. Writing: Short Stories. (AL) Class discussion of students' manuscripts, individual conferences with the instructor. Open to sophomores, juniors, and seniors; recommended for, but not limited to, students who have taken English 100A. Consent of instructor required. One course each. *Applewhite, Cox, M. Lentricchia, Pope, Porter, or Price*

105S, 106S. The Writing of Poetry. (AL) Meter, image, tone, and dramatic organization in traditional and modern poems as a basis for original composition. Open to sophomores, juniors, and seniors; recommended for, but not limited to, students who have taken English 100C. Consent of instructor required. One course each. *Applewhite or Pope*

107S. Playwriting I. (AL) Fundamentals of writing for stage and screen. Open to sophomores, juniors, and seniors; recommended for, but not limited to, students who have taken English 100B. Prerequisites: a practical theater course (for example, acting, directing, design, stagecraft) and consent of instructor. C-L: Drama 111S and Film and Video. One course. *Staff*

108S. Playwriting II. (AL) Advanced projects in writing for production. Prerequisites: Drama 111S or English 107S; Drama 99S, 101S, or 181S; and consent of instructor. C-L: Drama 112S and Film and Video. One course. *Staff*

109S. Special Topics in Writing. (AL) Consent of instructor required. One course. *Staff*

110S. Writing: Longer Prose Narrative. (AL) The writing of a novel, novella, or group of short stories. Primarily for juniors and seniors. Consent of instructor required. One course. *Cox, Porter, or Price*

111. Introduction to Linguistics. (SS) See C-L: Cultural Anthropology 107; also C-L: Interdisciplinary Course 111 and Linguistics. One course. *Butters or Tetel*

112. English Historical Linguistics. (SS) Introduction to methods and principles of historical linguistics, as exemplified by the history of the English language from Proto-

Indo-European to the present. Not open to students who have taken English 208. C-L: Linguistics. One course. *Butters or Tetel*

116A. Scientific Writing. Prerequisite: University Writing Course 4, 5, 6, or 7. See C-L: University Writing Course 112. One course. *Staff*

117A, S. Advanced Composition I. See C-L: University Writing Course 117S. One course. *Staff*

117B, S. Advanced Composition II. Prerequisite: successful completion of English 117A. See C-L: University Writing Course 118S. One course. *Staff*

118S. The Teaching of Composition, Grammar, and Literature in Secondary School. Visits to secondary school English classes, discussion with successful teachers, practice in making presentations, and evaluation of written work and other performance. C-L: Education 189S and Linguistics. One course. *Staff*

119. Current Topics in Linguistics. (SS) May be repeated as topics vary. See C-L: Cultural Anthropology 112; also C-L: Interdisciplinary Course 119 and Linguistics. One course. *Staff*

For Juniors, Seniors, and Graduates

202S. Narrative Writing. (AL) The writing of short stories, memoirs, tales, and other narrations. Readings from ancient and modern narrative. Close discussion of frequent submissions by class members. Consent of instructor required. One course. *Price*

203S. Advanced Narrative Writing. (AL) The writing of extended narrative prose—long stories, novellas, substantive memoirs. Students should be proficient in the writing of short narratives. Consent of instructor required. One course. *Price*

205. Semiotics and Linguistics. (SS) See C-L: Russian 205. One course. *Andrews (Slavic)*

208. History of the English Language. (SS) Introductory survey of the changes in sounds, forms, and vocabulary of the English language from its beginning to the present, with emphasis on the evolution of the language as a medium of literary expression. Not open to students who have taken English 112. C-L: Linguistics and Medieval and Renaissance Studies. One course. *Butters or Tetel*

290. Methods of Composition Pedagogy. (SS) A philosophical and practical exploration of developments in the field of composition studies. Cognition, concept formation, psycholinguistics, interpretation, and the making of meaning. Works by Burke, Richards, Kitzhaber, Berlin, Berthoff, Bizzell, Elbow, Corbett, Macrorie, Williams, Coles, and others. One course. *Gopen and Hillard*

INTRODUCTION TO LITERATURE

20. Literature and Composition. Credit for advanced placement on the basis of the College Board examination in literature and composition. One course.

21S. Studies in the Novel. (AL) One course. *Staff*

22S. Studies in Drama. (AL) One course. *Staff*

23S. Studies in the Short Story. (AL) One course. *Staff*

24S. Studies in Poetry. (AL) One course. *Staff*

25S. Studies in the Epic. (AL) One course. *Staff*

26S. Studies in Special Topics. (AL) May be taken twice. One course. *Staff*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

50S. American Literature Walkabout. An experimental course designed to engage students with literature at the deepest level. The main texts will be *Moby-Dick*, *Beloved*, *The Awakening*, readings from Thoreau, "Song of Myself," and other poems. Approaches will be largely student generated and may include field trips, graphic representation, autobiography, and drama. Emphasis on group interaction, self-discovery, experiential learning. Weekly writing assignments. Pass/fail grading only. One course. *Tompkins*

51, 52. Representative American Writers. (AL) Selections and complete works. 51: Poe, Emerson or Thoreau, Hawthorne, Melville, Whitman, Dickinson, and Twain; not open to students who have taken English 152 or 153. 52: James, Frost or Robinson, Crane or Dreiser, O'Neill, Faulkner, Hemingway, and others. Not open to students who have taken English 153 or 154. One course each. *Staff*

90. Reading Critically: Poetry, Fiction, Drama. (AL) An introduction to the skills of critical reading and the vocabulary of critical analysis by close examination of poetry, fiction, and drama from a range of historical periods. A handbook or comparable guide to critical terms will be assigned. One course. *Staff*

90S. Reading Critically: Poetry, Fiction, Drama. (AL) A seminar version of English 90. One course. *Staff*

91. Reading Critically: Chaucer, Shakespeare, Milton, Pope. (AL) An introduction to the skills of critical reading and the vocabulary of critical analysis by close examination of the works of Chaucer, Shakespeare (or occasionally Spenser), Milton, and Pope. Focus on the acquisition of critical skills through analyzing the works of authors closely linked with the making of the dominant traditions of English poetry. A handbook or comparable guide to critical terms will be assigned. One course. *Staff*

92. British Literature 1750-1950. (AL) Studies in the literature of Great Britain from the eighteenth century through the modern period. One course. *Staff*

94. Introduction to Theater. (AL) See C-L: Drama 51. One course. *Clum or Riddell*

ENGLISH AND BRITISH LITERATURE

113A. Introduction to Old English. (AL) An introduction to the language of the Anglo-Saxon period (700-1100), with readings in representative prose and poetry. Not open to students who have taken 207A or the equivalent. C-L: Linguistics and Medieval and Renaissance Studies. One course. *Staff*

113B. Old English Literature. (AL) Critical study of Anglo-Saxon prose and poetry, with attention to the historical and cultural context. Not open to students who have taken 207B. Prerequisite: English 113A, 207A, or the equivalent. C-L: Medieval and Renaissance Studies. One course. *Staff*

121. Medieval English Literature to 1500. (AL) The principal forms and examples of English prose, poetry, and drama of the Anglo-Saxon and Middle English periods (excluding Chaucer). In translation. C-L: Medieval and Renaissance Studies. One course. *Staff*

122. Sixteenth-Century English Literature. (AL) Emphasis in poetry on Wyatt, Sidney, Spenser, Raleigh, and Shakespeare; in prose on Sidney and Sir Thomas More; in drama on Marlowe. C-L: Medieval and Renaissance Studies. One course. *DeNeef, Fish, Randall, or Schwartz*

123. English Literature: 1600 to 1660. (AL) Emphasis in poetry on Jonson and the cavaliers, Donne and the metaphysicals; in drama on Jonson, Tourneur, Webster, and

Ford; in prose on character writers, Bacon, Burton, Donne, and Browne. C-L: Medieval and Renaissance Studies. One course. *DeNeef, Fish, A. Patterson, Randall, or Schwartz*

124. **English Literature: 1660 to 1800.** (AL) Major genres and authors such as Dryden, Congreve, Addison, Swift, Pope, Gray, Johnson, Blake, and Defoe or Fielding. One course. *Jackson or Thorn*

125. **English Literature of the Romantic Period.** (AL) Wordsworth, Coleridge, Byron, Shelley, Keats. One course. *Applewhite, Gleckner, Jackson, or Pfau*

126. **English Literature: 1832 to 1900.** (AL) Major writers and genres, with special emphasis on the Brontës, Dickens, Hardy, Tennyson, Carlyle, Browning, Arnold, and Ruskin. One course. *Ryals or Sedgwick*

127. **British Literature: 1900 to 1945.** (AL) Principal writers of fiction, drama, and poetry such as Yeats, Conrad, Shaw, Joyce, Lawrence, Woolf, Eliot, Auden, and others. One course. *Mellown, Moses, or Pope*

128. **Special Topics in British Literature since 1945.** (AL) One course. *Staff*

130. **Shakespeare and the Theater.** (AL) See C-L: Drama 154. One course. *Clum or Randall*

131. **Studies in a Single British Author.** (AL) One course. *Staff*

132A. **Faith and Fiction in Victorian England.** (AL) (Summer program in England.) Not open to students who have taken English 137. See C-L: Religion 186. One course. *Staff*

132B. **Atmosphere and Mystery in Twentieth-Century English Fiction.** (AL) Not open to students who have taken English 138. See C-L: Religion 187. One course. *Kort*

132E, S. **Nineteenth-Century British Literature.** (AL) (Taught in the Oxford summer program.) Two courses. *Staff*

132G, S. **Twentieth-Century British Literature.** (AL) (Taught in the Oxford summer program.) Two courses. *Staff*

133. **Modern British Drama.** (AL) O'Casey, Coward, Eliot, Osborne, Pinter, Beckett, Stoppard, and others. C-L: Drama 121. One course. *Clum or Moses*

134S. **Drama in Performance.** (AL) Drama from the Elizabethan period to the present based on performances offered by the Royal Shakespeare Company, Royal National Theatre, and other theaters in London. Twenty plays will be seen and studied. (London summer program.) C-L: Drama 149S. One course. *Clum*

136. **Eighteenth-Century British Novel.** (AL) Defoe, Richardson, Fielding, Smollett, and Sterne; the Gothic novel. One course. *Jackson or Thorn*

137. **Nineteenth-Century British Novel.** (AL) Scott, Austen, Dickens, Thackeray, Trollope, the Brontës, George Eliot, Meredith, Butler, Hardy, and others. Not open to students who have taken English 132A. One course. *A. Davidson, Moses, Ryals, or Sedgwick*

138. **Twentieth-Century British Novel.** (AL) Conrad, Lawrence, Forster, Joyce, Woolf, Huxley, Cary, Amis, and Golding. Not open to students who have taken English 132B. One course. *A. Davidson, Mellown, Moses, or Pope*

139S. **Special Topics in British Literature.** (AL) One course. *Staff*

Major Authors

140, 141. Chaucer. (AL) 140: first two-thirds of his career, especially *Troilus and Criseyde*. 141: *The Canterbury Tales*. C-L: Medieval and Renaissance Studies. One course each. *Staff*

143, 144. Shakespeare. (AL) 143: twelve plays before 1600. 144: usually ten plays after 1600. C-L: Drama 115, 116 and Medieval and Renaissance Studies. One course each. *DeNeef, Gopen, Jones, Porter, Randall, or Valbuena*

145. Milton. (AL) Poetry and its literary and social background. C-L: Medieval and Renaissance Studies. One course. *Fish, Price, or Schwartz*

For Juniors, Seniors, and Graduates

207A. Introduction to Old English. (AL) An introduction to the language of the Anglo-Saxon period (700-1100), with readings in representative prose and poetry. Not open to students who have taken 113A or the equivalent. C-L: Linguistics and Medieval and Renaissance Studies. One course. *Staff*

207B. Old English Literature. (AL) Critical study of Anglo-Saxon prose and poetry, with attention to the historical and cultural context. Not open to students who have taken 113B. Prerequisite: English 113A, 207A or the equivalent. C-L: Medieval and Renaissance Studies. One course. *Staff*

212. Middle English Literature: 1100 to 1500. (AL) Selected topics. C-L: Medieval and Renaissance Studies. One course. *Staff*

213, 214. Chaucer. (AL) 213: first two-thirds of his career, especially *Troilus and Criseyde*. 214: *The Canterbury Tales*. C-L: Medieval and Renaissance Studies. One course each. *Staff*

221. Renaissance Prose and Poetry: 1500 to 1660. (AL) Selected topics. C-L: Medieval and Renaissance Studies. One course. *DeNeef, Fish, Randall, or Schwartz*

222. Reading Milton. (AL) Milton's epic as a way of exploring some of the questions that have recently been asked about the humanities in general and literary studies in particular. Is the reconstruction of a perspective within which older texts can be responsibly read possible? What do you have to "know" in order to read *Paradise Lost*? What do you have to know in order to know what you have to know to read *Paradise Lost*? Obviously, *Paradise Lost* will be the center of the course, but we shall also read others of Milton's works and look into the tight little world of Milton criticism. C-L: Distinguished Professor Course 222. One course. *Fish*

225. Renaissance Drama: 1500 to 1642. (AL) Selected topics. C-L: Drama 225 and Medieval and Renaissance Studies. One course. *Randall*

235. Restoration and Eighteenth-Century Literature: 1660 to 1800. (AL) Selected topics. One course. *Jackson or Thorn*

241. Romantic Literature: 1790 to 1830. (AL) Selected topics. One course. *Applewhite, Gleckner, Jackson, or Pfau*

245. Victorian Literature: 1830 to 1900. (AL) Selected topics. One course. *Ryals or Sedgwick*

251. British Literature since 1900. (AL) Selected topics. One course. *F. Lentricchia, Mellown, Moses, or Torgovnick*

AMERICAN LITERATURE

152. American Literature: 1820 to 1860. (AL) Prose and poetry of American romanticism: Emerson, Thoreau, Hawthorne, Poe, Melville, and Whitman. Not open to students who have taken English 51. One course. *C. Davidson, Gerber, Jones, Moon, Tompkins, or K. Williams*

153. American Literature: 1860 to 1915. (AL) Dickinson, Twain, James, the social and philosophical essayists, Crane, Dreiser, Robinson, and Frost. Not open to students who have taken English 52. One course. *C. Davidson, Jones, Moon, or K. Williams*

154. American Literature: 1915 to 1960. (AL) Eliot, Fitzgerald, Hemingway, Faulkner, and others. Not open to students who have taken English 52. One course. *Clum, Ferraro, F. Lentricchia, Moon, Moses, Pope, or Strandberg*

155. Contemporary American Writers. (AL) Novelists and poets prominent since 1960. One course. *Clum, C. Davidson, Ferraro, Moses, or Strandberg*

159. Modern Southern Writers. (AL) Writers who came to maturity following World War I, and their successors: Faulkner, Wolfe, Porter, Tate, Warren, Welty, Taylor, Percy, O'Connor, Dickey, Hurston, Walker, and others. Works analyzed in the historical and cultural context of the region. One course. *Applewhite*

161. Studies in a Single American Author. (AL) One course. *Staff*

162. Twentieth-Century American Drama. (AL) Representative plays by O'Neill, Odets, Williams, Miller, Albee, Lanford Wilson, and others. C-L: Drama 120. One course. *Clum*

163. Twentieth-Century American Poetry. (AL) The classicism of Pound, Eliot, and the Fugitives in relation to the neoromanticism of Stevens, Williams, Crane, and Roethke. Developments during World War II and after: Lowell, Jarrell, Berryman, Dickey, Levertov, and Wright. One course. *Applewhite, Moon, Moses, or Pope*

167, 168. African American Literature. (AL) 167: oral and literary traditions from the American colonial period into the nineteenth century, including the spiritual as lyric poetry and the slave narrative as autobiography. 168: the late nineteenth and early twentieth century to contemporary writers. C-L: African and Afro-American Studies 173, 174. One course each. *Chandler or Holloway*

169S. Special Topics in American Literature. (AL) One course. *Staff*

For Juniors, Seniors, and Graduates

263. American Literature to 1865. (AL) Selected topics. One course. *C. Davidson, Jones, Moon, or Tompkins*

267. American Literature: 1865 to 1915. (AL) Selected topics. One course. *C. Davidson, Tompkins, or K. Williams*

269. American Women Writers. (AL) Selected topics. C-L: Women's Studies. One course. *C. Davidson, Pope, or Tompkins*

275. American Literature since 1915. (AL) Selected topics. One course. *Ferraro, F. Lentricchia, Pope, or Strandberg*

GENRE, CRITICISM, AND WORLD LITERATURE

170. Studies in Genre. (AL) One course. *Staff*

172. Literary Theory. (AL) Major works and theoretical issues in the history of literary criticism. One course. *Staff*

174A, S. Drama and Theater from 1590 to 1700. (AL) See C-L: Drama 151S; also C-L: Literature 173S. One course. *Clum or Randall*

174B. World Theater: Realism and Modernisms. (AL) See C-L: Drama 152; also C-L: Literature 174. One course. *Clum or Riddell*

175. Literary Approaches to the Bible. (AL) Selected books of both Testaments, emphasizing narrative strategies, literary contexts, and Biblical genres: primeval myth, patriarchal history, prophecy, and apocalyptic. One course. *Schwartz*

176S. Text and Performance. (AL) The stages of realization of a play or musical from the script to the production, focusing on productions in London. Aspects of theatrical performance and production through backstage tours, scene work, discussions and workshops with theater practitioners, observations of theater at work, and supervised projects. (London summer program.) C-L: Drama 148S. One course. *Clum*

177. Third World and Postcolonial Fiction. (AL) Comparative study of representative contemporary fiction from Africa, India, the Middle East, Australia, New Zealand, Latin America, and the Caribbean, each within its appropriate cultural, historical, and political context. All readings in English. One course. *Moses*

178. Literature and the Other Arts. (AL) Selected topics in the study of the interrelation of literature and other art forms, such as music and painting. One course. *Staff*

179S. Special Topics in a Literary Genre. (AL) One course. *Staff*

180. Writings in the Rural Tradition: From the Caribbean to the American South. (AL) See C-L: Literature 180; also C-L: African and Afro-American Studies 180 and Comparative Area Studies. One course. *Willis*

184. Literature and Sexualities. (AL) American and British representations of sexual identities and same-sex desire, ranging from the proliferation of homo-/heterosexual discourses in the late nineteenth century to literature about AIDS in contemporary mass media. Whitman, Wilde, Stein, Hall, Forster, Lorde, Moraga, Watney, and others. One course. *Clum or Moon*

186A, S. Canadian Literature in English. (AL) Eighteenth century to the present. Emphasis on the twentieth century and on novels by Hugh MacLennan, Margaret Laurence, Mordecai Richler, Margaret Atwood, Rudy Wiebe, and others. C-L: Canadian Studies and Comparative Area Studies. One course. *A. Davidson*

186B, S. Canadian Theater. (AL) A survey of Canadian drama. C-L: Canadian Studies. One course. *Staff*

For Juniors, Seniors, and Graduates

281. Studies in Genre. (AL) History, criticism, and theory of literary genres such as the novel, pastoral, epic, and drama. One course. *Staff*

285. Major Texts in the History of Literary Criticism. (AL) A survey of major critical writings from Aristotle to the present. One course. *Staff*

288. Special Topics. (AL) Subjects, areas, or themes that cut across historical eras, several national literatures, or genres. One course. *Staff*

289. The Theory of the Novel. (AL) Major issues in the history and theory of the novel. One course. *Moses or Torgovnick*

CULTURAL STUDIES

101A. Introduction to Film. (AL) Basic film theory and history of motion picture technology. Introduction to experimental, documentary, and narrative forms of Third

World, European, and United States cinemas. Economics and aesthetics. C-L: Drama 132 and Film and Video. One course. *Gaines*

101B. Introduction to Cultural Studies. (AL) Basic theoretical approaches to high and low culture—Bourdieu and Adorno, the Frankfurt School and the Birmingham Center for Contemporary Cultural Studies; Third World and feminist approaches; the avant-garde and subcultural resistance. Analysis of sport and leisure, film and photography, law and the arts, popular and classical music, painting and advertising imagery. C-L: Film and Video and Literature 102. One course. *Gaines, Radway, Surin, Tompkins, or Willis*

101D, D. Perspectives in Gay, Lesbian, and Bisexual Studies. (CZ) See C-L: Interdisciplinary Course 115D. One course. *Staff*

120. Advertising and Society. (SS) See C-L: Cultural Anthropology 110; also C-L: Film and Video, Sociology 160, and Women's Studies. One course. *Luttrell, O'Barr, J. Smith, or Wilson*

156. History of Mass Culture in the United States. (AL) The formation of American popular culture in different historical periods. Cultural forms including music, movies, fashion, and leisure. C-L: Literature 156. One course. *Gaines, Radway (literature), Tompkins, or Willis*

157, 158. American Literature and Culture. (AL) Relationship of literature to the other arts, American intellectual history, religion, science, technology, and architecture. 157: to the Civil War. 158: from the Civil War to 1960. One course each. *K. Williams*

181. Psychoanalysis, Literature, and Film. (AL) See C-L: Literature 185; also C-L: Comparative Area Studies, Film and Video, and Women's Studies. One course. *Gaines*

183S. Film and Video Theory and Practice. (AL) Film and video production in conjunction with comparative history and theory of these technologies. Students produce works in basic Super 8 mm, 16 mm, and small format video production. Prerequisite: Drama 132, English 101A, or Literature 177. C-L: Institute of the Arts 115S, Drama 131S, and Film and Video. One course. *Staff*

185. Studies in Film History. (AL) Close examination of a particular issue, period, national cinema, or technological development. C-L: Drama 136, Film and Video, and Literature 187. One course. *Clum, Gaines, or Jameson*

187. Melodrama and Soap Opera. (AL) History of melodrama from Victorian theatrical production to television soap opera. Close study of popular women's fiction, silent cinema, the thirties and forties woman's picture, and fifties technicolor melodrama. C-L: Drama 137, Film and Video, and Women's Studies. One course. *Clum or Gaines*

189S. Special Topics in Film. (AL) A major genre, period, or director. Prerequisite: Drama 132 or English 101A. C-L: Drama 197S and Film and Video. One course. *Clum or Gaines*

For Juniors, Seniors, and Graduates

284. Contemporary Film Theory. (AL) Post-1968 film theory—Brechtian aesthetics, cinema semiotics, psychoanalytic film theory, technology, feminist theory, and Third World cinema. One course. *Gaines*

INDEPENDENT STUDY

191, 192, 193, 194. Independent Study. Directed reading and research. Consent of both the instructor and the Director of Undergraduate Studies required. Half or one course each. Variable credit. *Staff*

195T. Tutorial. Directed reading and research. Students should consult the Director of Undergraduate Studies as early as possible in the preceding term. One course. *Staff*

197A,S 198A, S. Distinction Program Sequence. Open to those whose thesis will be a critical paper or piece of other research (e.g., in linguistics). Consent of instructor required. One course each. *Staff*

197B,S 198B, S. Distinction Program Sequence. Open to those whose thesis will be in the field of creative writing. Consent of instructor required. One course each. *Staff*

COURSES CURRENTLY UNSCHEDULED

102S. Screenwriting. (AL)

115. Present-Day English. (SS)

135. British Poetry of the Twentieth Century. (AL)

151. American Literature to 1820. (AL)

164, 165. American Fiction. (AL)

171S. Theater Farce. (AL)

173. Legend and Literature. (AL)

182. American Film Genres. (AL)

188. Narrative Film and the Novel. (AL)

190. Television, Technology, and Culture. (AL)

209. Present-Day English. (SS)

THE MAJOR

For students matriculating in the fall 1992 semester and thereafter:

Basic Requirement. One course from the following list of introductory courses: English 90, 90S, or 91. Except by written permission of the Director of Undergraduate Studies, the course must be taken in the first term after the major has been declared (unless it has been taken earlier). It may be taken concurrently with advanced courses.

Major Requirements. Eight or more courses at the 100- or 200-level, which are to be organized into a coherent plan of study approved by the student's advisor. The courses must include: (a) one of the following major author courses—Chaucer (140, 141, 213, 214), Shakespeare (143, 144), or Milton (145, 222); (b) two courses in British literature before 1900 (including at least one before 1800 in addition to the course taken to satisfy the major author requirement); (c) one 100-level seminar. Recommended, but not required: students planning to enter graduate study in English or American literature should plan to take at least two additional 100-level (or 200-level) courses in British literature before 1900, including at least one more before 1800.

For students who matriculated before the fall 1992 semester:

Students may satisfy the requirements listed above for those matriculating in the fall 1992 semester and thereafter or they may satisfy the requirements as published in the Bulletin for the year that they matriculated.

Foreign Languages

The department recommends that students majoring in English complete at least two years of college-level study, or the equivalent, of a foreign language. Students

contemplating graduate work in English should note that many master's programs require examination in one foreign language and that doctoral programs commonly require examination in two. Students interested in linguistics are strongly urged to study at least one non-Indo-European language.

Teacher Certification

Each year a number of Duke English majors earn certificates as secondary school teachers. While licensed by the state of North Carolina, such majors are essentially certified for other states as well. Such training is urged also for those who consider private-school teaching since most private or parochial schools, other things being equal, would prefer the experienced and trained candidate. Such licensing may be gained as part of the English major and is not as time consuming as sometimes believed. Candidates should have a solid background in both American and British literature. Also helpful are courses in composition, drama, and speech. Among the requirements are an appropriate course in language and several courses in education.

The last semester of the senior year is devoted to the student-teaching block, including two special, accelerated courses and ten weeks of full-time teaching and observation in the schools, working with a selected certified teacher and with Duke faculty. This experience leads to an English-teaching certificate to accompany the bachelor's degree.

Anyone considering secondary school English teaching should confer with Professor Malone in the Program in Education as soon as possible.

Honors/Distinction

The graduation with distinction program is designed for the department's best and most serious students who are willing to make a sustained commitment to the distinction project. The program consists of two seminars—English 197A,SA and 198A,S or 197B,SB and 198B,S—taken in the fall and spring semesters of the senior year.

English 197S varies in content and format according to the interests of the instructor and students. It also provides a forum in which to discuss the selection and focusing of thesis topics, preliminary research and organization, and the writing of part of the thesis. English 198S will involve substantial independent work towards completing the distinction thesis, with some seminar meetings and regular conferences with the instructor. The distinction thesis can be a critical paper or an equivalent piece of other research (for example, in linguistics) or creative writing. The department's distinction/honors committee will evaluate the theses and award distinction. A student who has done satisfactory work in the seminars but whose thesis is denied distinction will receive graded credit for English 197A,S and 198A,S or 197B,S and 198B,S, but not distinction. Theses awarded distinction will be bound and deposited in Perkins Library. Students interested in distinction must apply to the department's committee by February 15 of the junior year. Applicants normally must have completed at least three courses in English (not including a University Writing Course) and must have a minimum 3.3 average in their English courses. In addition, they must submit a writing sample and solicit a written recommendation from one of their instructors (in courses other than the University Writing Course).

Students who matriculated after May 1988 and who successfully complete the distinction program as detailed above may be eligible as well for graduation with Latin honors. To be awarded Latin honors in this way at graduation, a student must have maintained a 3.5 grade point average in English and a 3.3 grade point average overall and written a distinction thesis of exceptional merit, as evaluated by the department's distinction/honors committee.

School of the Environment

The professional school courses listed below are described fully in the *Bulletin of Duke University: School of the Environment*. They are open to undergraduates by consent of the instructor; they do not count for area of knowledge distribution requirements.

Students who are preparing for professional careers in natural resources and the environment should refer to the section on undergraduate-professional combination programs and the section Environmental Sciences and Policy Program in this bulletin.

191, 192. Independent Study. Open to qualified juniors and seniors with consent of the student's major advisor and the instructor. Credit to be arranged. *Staff*

200. Integrated Case Studies. Prerequisite: consent of the dean of the School of the Environment. Credit to be arranged. *Staff*

201. Forest Resources Field Skills. Half course. *Davison and Richter*

204. Forest Inventory, Growth, and Yield. One course. *Davison*

205, 205L. Ecological Management of Forest Systems (Silviculture). One course. *Oren*

207, 207L. Forest Pest Management. One course. *Stambaugh*

211L. Applied Ecology and Ecosystem Management. Prerequisites: introductory course in biology and ecology. One course. *Richardson*

212. Environmental Toxicology. Prerequisites: organic chemistry and vertebrate physiology or consent of instructor. One course. *Di Giulio*

213. Forest Ecosystems. One course. *Richter*

215. Environmental Physiology. One course. *Di Giulio and Oren*

216. Applied Population Ecology. Prerequisites: introductory statistics, calculus, and computer programming, or consent of instructor. One course. *Maguire*

217. Tropical Ecology. Prerequisite: a course in general ecology. C-L: Biology 215. One course. *Terborgh*

218L. Barrier Island Ecology. (Given at Beaufort.) Prerequisite: introductory biology; suggested: course in botany or general ecology. C-L: Biology 218 and Marine Sciences. One and one-half courses. *Staff*

219L. Marine Ecology. (Given at Beaufort.) Prerequisites: none; suggested—introductory ecology, invertebrate zoology, or marine botany. C-L: Biology 203L and Marine Sciences. One and one-half courses. *Gerhart*

220. Vegetation Management in Urban Ecosystems. One course. *Stambaugh*

221. Soil Resources. One course. *Richter*

222S. Coastal Processes. (Given at Beaufort.) Prerequisites: Mathematics 31 and 32. C-L: Geology 201S and Marine Sciences. Half course. *Howd*

224S. Molecular and Cellular Adaptations of Marine Organisms. (Given at Beaufort.) C-L: Cell Biology 270S and Marine Sciences. One-half course. *C. Bonaventura*

225L. Coastal Ecotoxicology and Pollution. (Given at Beaufort.) Prerequisites: introductory chemistry and biology. C-L: Marine Sciences. One course. *Staff*

226L. Marine Mammals. (Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. One course. *Staff*

230L. Weather and Climate. One course. *Knoerr*

231. Climatic Change. (Given at Beaufort.) C-L: Geology 209 and Marine Sciences. One course. *Johnson*

232. Microclimatology. C-L: Biology 232. One course. *Knoerr*

234L. Watershed Hydrology. One course. *Staff*

235. Air Quality Management. One course. *Vandenberg*

236. Water Quality Management. One course. *Reckhow*

238. Hydrologic Transport Processes. Prerequisites: Environment 234, 242, or equivalent and familiarity with calculus. One course. *Staff*

240. Fate of Organic Chemicals in the Aquatic Environment. Prerequisites: university-level general chemistry and organic chemistry within last four years. C-L: Civil and Environmental Engineering 240. One course. *Dubay and Faust*

241. Atmospheric Chemistry and Air Pollution. Prerequisites: university-level general chemistry and organic chemistry within last four years. C-L: Civil Engineering 241. One course. *Faust*

242. Environmental Aquatic Chemistry. Prerequisite: university-level general chemistry within the last four years. C-L: Civil and Environmental Engineering 242. One course. *Faust*

243. Environmental Biochemistry. (Given at Beaufort.) Prerequisite: organic chemistry. C-L: Cell Biology 243 and Marine Sciences. One course. *C. Bonaventura and Brouwer*

244. Cellular and Molecular Research Techniques. (Given at Beaufort.) C-L: Cell Biology 244 and Marine Sciences. One course. *C. Bonaventura and Brouwer*

245. Ecology of Microorganisms. One course. *Shafer*

246. Survey of Occupational Health and Safety. Prerequisite: consent of instructor. One course. *Staff*

247. Survey of Environmental Health and Safety. Prerequisite: consent of instructor. One course. *Staff*
248. Solid Waste Engineering. Prerequisite: Civil Engineering 124L or consent of instructor. C-L: Civil Engineering 248. One course. *Vesilind*
251. Statistics and Data Analysis in Biological Science. C-L: Statistics 210B. One course. *Staff*
- 252L. Techniques in Environmental Data Analysis. (Given at Beaufort.) Prerequisites: Mathematics 31 and 32. C-L: Geology 222L and Marine Sciences. One course. *Howd*
253. Biometry. Prerequisite: Mathematics 136, Psychology 117, Sociology 133, Statistics 10D, 100, 112, 114, 213, or equivalent. C-L: Biological Anthropology and Anatomy 250. One course. *Gerhart and White*
- 254, 254L. Advanced Research Training in Marine Molecular Biology and Biotechnology. (Given at Beaufort.) Prerequisites: biochemistry and cell biology or equivalent; for undergraduates, consent of instructor required. C-L: Cell Biology 235, 235L and Marine Sciences. One course; with lab, one and one-half courses. *Staff*
261. Remote Sensing for Resource Management. One course. *Davison*
- 270L. Resource and Environmental Economics. Prerequisite: introductory course in microeconomics. C-L: Economics 270L and Public Policy Studies 272L. One course. *Kramer*
271. Economic Analysis of Resource and Environmental Policies. Prerequisite: Environment 270 or equivalent; Economics 149 is recommended. C-L: Economics 272. One course. *Staff*
272. Evaluation of Public Expenditures. C-L: Economics 261 and Public Policy Studies 261. One course. *Conrad*
274. Resource and Environmental Policy. Prerequisite: Environment 270L, Public Policy Studies 272, or consent of instructor. C-L: Public Policy Studies 274. One course. *Healy*
277. Conservation and Sustainable Development I: Concepts and Methods. One course. *Staff*
278. Conservation and Sustainable Development II: Integrated Problem Solving. One course. *Staff*
- 282S. Environmental Ethics. Consent of instructor required. C-L: Philosophy 289S. One course. *Cooper*
285. Land Use Principles and Policy. C-L: Public Policy Studies 285. One course. *Healy*
290. Physical Oceanography. Prerequisites: Mathematics 31 and 32 or consent of instructor. C-L: Geology 203 and Mechanical Engineering 290. One course. *Lozier*
- 291S. Geological Oceanography. Not open to students who have taken Geology 206S. (Given at Beaufort.) C-L: Geology 205S and Marine Sciences. One course. *Staff*
- 297L. Biology of Marine Invertebrates. (Given at Beaufort.) Not open to undergraduate students who have taken Biology 176L. Prerequisite: Biology 21L, 22L or equivalents. C-L: Biology 274L and Marine Sciences. One and one-half courses. *Staff*

COURSES CURRENTLY UNSCHEDULED

- 210, 210L. Forest Pathology
- 296L. Benthic Marine Algae

Environmental Sciences and Policy Program

Professor Kramer, *Director*

A major is available in this program.

The undergraduate major in environmental sciences and policy is offered within the Bachelor of Arts degree to students interested in the interdisciplinary study of environmental issues. The major permits students to combine studies in the natural sciences and engineering with courses in social sciences and humanities around general focus areas and themes. This major is specifically designed for students with career objectives such as environmental law, policy, management, or planning that require in-depth understanding of environmental issues that cross traditional disciplinary boundaries.

Elective courses for the major are taught by more than sixty Duke professors in twenty cooperating departments and schools. The prerequisites for this major stress a firm foundation in basic natural and social science areas. An introductory core course focuses on local, regional, and global case histories from the perspective of an interdisciplinary team of faculty. Upper-level courses are selected in consultation with advisors to match a specific environmental theme or career objective. The upper-level curriculum includes a course in probability and statistics, an upper-level seminar, and an independent study, internship, or field experience. At least two courses in the upper-level curriculum must be selected from approved lists in each of the social sciences/human-

ities and sciences/engineering. The program is administered by its director and an advisory committee representing the various areas and cooperating departments.

Advising: Advisors are assigned based on students' general areas of interest. Students present a proposed plan of study to their advisors that emphasizes the connections among their courses. This proposal is normally completed by the end of the sophomore year. The program encourages close relationships between faculty and students with convergent interests.

Independent Study, Internship, or Field Experience. All students in the program will complete either an independent study, an internship, or a field experience related to their proposed course of study. The director's office, in collaboration with Duke's Career Development and Counseling Office, maintains a file of available internships. Field experiences may include a semester or summer session at the Duke University Marine Laboratory, one of several approved study abroad programs, or studies at over thirty field laboratories.

Grants and Awards. Grants and awards are administered through the office of the Environmental Sciences and Policy Program. These include support for independent studies, internships, and field studies.

THE MAJOR

Corequisites. The following courses or their equivalents (for example, Advanced Placement credit) are required. Approval to substitute courses taken at other universities must be obtained from the director of undergraduate studies in the department offering the course. Some of these courses are prerequisite to some upper-level courses in this major.

Biology 21L. Introduction to Organismal and Environmental Biology

Biology 22L. Introduction to Cellular and Developmental Biology

Chemistry 11L and 12L. Principles of Chemistry, or Chemistry 23L. Advanced General Chemistry

Economics 2D or 52D. Competition, Monopoly, and Welfare

Geology 41. Introduction to Geology

Political Science 145. Political Analysis for Public Policy-Making (or Public Policy Studies 114)

Mathematics 31 and 32. Introductory Calculus I and II

Major Requirements.

1. *Introductory Core Course:* Environment 101. (SS) Introduction to Environmental Sciences and Policy. Application of basic principles of natural science, environmental economics and policy, engineering, and ethics to local, regional, and global environmental issues. Not open to first-year students.
2. *Probability and Statistics.* One course from an approved list dealing with statistical inference and probability theory. Approved courses include:
 - Political Science 138. Quantitative Political Analysis
 - Public Policy Studies 112. Statistics and Public Policy
 - Psychology 117. Statistical Methods
 - Statistics 110. Statistics and Data Analysis in the Social Sciences
 - Statistics 112. Introduction to Applied Statistics
 - Sociology 133. Statistical Methods
 - Environment 251. Natural Resources Data Analysis
3. *Focused Study.* Six upper-level courses proposed by students in consultation with their advisors to fit a particular theme or career objective. At least two of these courses must be selected from approved lists in each of the social sciences/humanities and sciences/engineering. These lists are available from the director of undergraduate studies of the program. One course must be an upper-level seminar or small-group learning experience.

4. *Independent Study/Internship/Field Experience.* Students will complete an approved independent study, internship, or field experience which may or may not include course credit toward upper-level requirements. See the director of undergraduate studies for an approved list of courses.

(Note: Courses in a major may count toward only two areas of knowledge for the general studies requirement of the curriculum. Students may not use more than six professional school credits toward the Bachelor of Arts degree.)

Honors. A program for graduation with distinction in environmental sciences and policy is available. See the section on honors in this bulletin. The director of undergraduate studies can provide more details.

Evolutionary Biology

See Biology.

Film and Video Program

Associate Professor Gaines, *Director*

A certificate, but not a major, is available in this program.

The Program in Film and Video is an interdisciplinary course of study which introduces students to the critical analysis of communications technologies: film, photography, and television. Practical production experience is also available through course work and internships. Courses in this area are offered through ten different academic departments and programs and taught by twenty faculty members. The program also sponsors speakers, video art screenings, and exhibits in cooperation with the Center for Documentary Studies, the Institute of the Arts, the Center for International Studies, the University Art Museum, the Literature Program, Asian and African Languages and Literature, and the Mary Lou Williams cultural center. Visiting independent filmmakers are brought to campus under the auspices of the Film and Video Program in conjunction with Screen/Society and Freewater exhibitions.

Students working toward a certificate in film and video declare a major in an academic department. To qualify for the certificate, students take five courses from the approved list published in this bulletin. One of these courses must be an introductory course selected from those listed below. Program courses are described under the listings of the various departments.

Introductory Courses

Cultural Anthropology 110. Advertising and Society. C-L: English 120, Sociology 160, and Women's Studies. *Luttrell, W. O'Barr, Smith, or Wilson*

English 101A. Introduction to Film. C-L: Drama 65. *Gaines*

English 101B. Introduction to Cultural Studies. C-L: Literature 102. *Gaines, Radway, Surin, Tompkins, or Willis*

English 182. American Film Genres. C-L: Drama 138. *Clum, Gaines, or Tompkins*

Art and Art History

165. Photography. *Noland*

Drama

111S. Playwriting I. C-L: English 107S. *Staff*

112S. Playwriting II. C-L: English 108S. *Staff*

English

101A. Introduction to Film. C-L: Drama 65. *Gaines*

101B. Introduction to Cultural Studies. C-L: Literature 102. *Gaines, Radway, Surin, Tompkins, or Willis*

156. History of Mass Culture in the United States. C-L: Literature 156. *Gaines, Radway, or Willis*

183S. Film and Video Theory and Practice. C-L: Institute of the Arts 115S and Drama 131S. *Staff*

185. Studies in Film History. C-L: Drama 136 and Literature 187. *Clum, Gaines, or Jameson*

187. Melodrama and Soap Opera. C-L: Drama 137 and Women's Studies. *Clum or Gaines*

189S. Special Topics in Film. C-L: Drama 197S. *Clum or Gaines*

History

104B. A Survey of Latin American History through Film. *TePaske*

Literature

25A. Third World Novel and Film. *Staff*

30. Special Topics in National Cinema. C-L: Comparative Area Studies. *Staff*

31. Special Topics in Hispanic Cinema. *Staff*

146. The Canadian Image: Cultural Production in French and English Canada. C-L: Canadian Studies and Comparative Area Studies. *A. Davidson*

177. Film Theory. C-L: Women's Studies. *Gaines*

185. Psychoanalysis, Literature, and Film. C-L: Comparative Area Studies, English 181, and Women's Studies. *Gaines*

186. Sexualities in Film and Video. *Clum, Gaines, or Moon*

195S. Topics in Advanced Film, Video, or Audio Production. *Staff*

195S. Documentary Film and Fiction. *Kaplan and Orr*

Political Science

153, 154. Politics and the Media of Mass Communication. *Paletz*

203S. Issues and Problems in Politics and the Media in the United States. *Paletz*

219S. Film and Politics. *Paletz*

Public Policy Studies

154S. Free Press and Public Policy. *Stevens*

163S. Telecommunications Policy and Regulation. *Prak*

176S. American Communities: A Photographic Approach. C-L: Art 118S. *Harris*

180S. Writing for the Media. *Eudy or Reid*

240S. Analyzing the News. C-L: Political Science 208S. *Paletz*

Romance Studies

Italian 170. Film and the Italian Novel. *Finucci*

Spanish 169.02. Spanish Cinema. *Vilarós*

Slavic Languages and Literature

Russian 130/230. Soviet Cinema. C-L: Literature 178. *Gaines, Jameson, or Lahusen*

Sociology

170. Mass Communication. C-L: Canadian Studies and Comparative Area Studies. *Smith*

182. The Media in Comparative Perspective. C-L: Canadian Studies, Comparative Area Studies, Interdisciplinary Course 182, and Political Science 180. *Smith*

French

For courses in French, see Romance Studies.

Genetics

For courses in genetics, see Biology and the University Program in Genetics.

The University Program in Genetics

Professor F. Ward, *Director* (immunology); Professor Boynton, *Coordinator of the Certificate Program* (botany); Professors Antonovics (botany), Bastia (microbiology), Counce (cell biology), Endow (microbiology), Gillham (zoology), Greenleaf (biochemistry), Hsieh (biochemistry), Joklik (microbiology), Keene (microbiology), Kredich (medicine and biochemistry), Laurie (zoology), Modrich (biochemistry), Nevins (microbiology and genetics), Nicklas (zoology), Rausher (zoology), Roses (neurobiology), Shaw (chemistry), Steege (biochemistry), Uyenoyama (zoology), and Webster (biochemistry); Associate Professors Burdett (microbiology), Cullen (genetics and microbiology), Greene (biochemistry), Kiehart (cell biology), Kreuzer (microbiology), Linney (microbiology), Schachat (cell biology), and Vilgalys (botany); Assistant Professors Been (biochemistry), Davis (cell biology), Dong (botany), Fehon (zoology), Garcia-Blanco (microbiology), Garrett (biochemistry), Heitman (genetics and pharmacology), Hershfield (biochemistry), Horowitz (microbiology), Kaufman (biochemistry), Kohorn (botany), Marchuk (genetics), Markert (immunology), Ostrowski (microbiology), Pickup (microbiology), Seldin (microbiology), Sun (botany), Swenson (cell biology), Titus (cell biology), and

Wharton (genetics and microbiology); Adjunct Professors Drake (National Institute of Environmental Health Sciences), Judd (National Institute of Environmental Health Sciences), Kunkel (National Institute of Environmental Health Sciences), and Resnick (National Institute of Environmental Health Science)

Genetics Program Courses

191, 192. Independent Study. Directed reading and research under the supervision of faculty members from the University Program in Genetics, subject to the consent of the instructor and of the coordinator of the Certificate Program in Genetics. Variable credit. *Staff (Genetics Program)*

For descriptions of the courses below consult the listings under the specified departments in the undergraduate and graduate bulletins.

Principles of Genetics. (Biology 180.) One course. *Antonovics, Boynton, Gillham, and Laurie*

Experimental Cell and Molecular Biology (Biology 184L.) One course. *Armaleo, Dong, and Sun*

Independent Study. (Biology 191 and 192.) Prerequisite: consent of instructor, coordinator of the Certificate Program, and the appropriate director of undergraduate studies prior to registration.

Genetic Mechanisms. (Genetics 215.) One course. *Nevins and staff*

Molecular Biology II: Nucleic Acids. (Biochemistry 268.) One course. *Steege*

DNA, Chromosomes, and Evolution (Biology 281.) *Laurie and Nicklas*

Molecular Genetics of Organelles. (Biology 283.) One course. *Boynton and Gillham*

Ecological Genetics. (Biology 285S.) One course. *Antonovics*

Evolutionary Mechanisms. (Biology 286.) One course. *Antonovics and Uyenoyama*

Mathematical Population Genetics. (Biology 288.) Calculus required; statistics and linear algebra recommended. One course. *Uyenoyama*

GENETICS CONCENTRATION FOR BIOLOGY MAJORS

Biology majors interested in completing the concentration in genetics available in that major should consult the director of undergraduate studies in biology.

CERTIFICATE IN GENETICS FOR NON-BIOLOGY MAJORS

A certificate is available in the Genetics Program to all non-biology majors. Acceptance into the certificate program is by arrangement with the coordinator of the Certificate Program in Genetics. The program offers students an opportunity to gain expertise in modern genetics with a view to its application to biology, medicine, public policy, law, or engineering. The courses in the certificate program are taught by members of the University Program in Genetics. Further details may be obtained from the Genetics Program office.

Required Courses:

Introductory Biology

Principles of Genetics (Biology 180)

An advanced course in molecular genetics, for example,

Experimental Cell and Molecular Biology (Biology 184L)

Molecular Biology II. Nucleic Acids (Biochemistry 268)*

Genetic Mechanisms (Genetics 215)†

One course from among: Biology 160, 184L, 244, 269, 281, 283, 285S, 286, 288, or

Genetics 215*, 227, 268*

Independent study with a member of the Genetics Program (University Program in Genetics 191, 192)

*Requires Biochemistry 259 or 227 as a prerequisite.

†Requires introductory genetics as a prerequisite.

Geology (GEO)

Professor Corliss, *Chair*; Assistant Professor Boudreau, *Director of Undergraduate Studies*; Professors Barber, Haff, Heron, Johnson, Karson, Kay, Livingstone, Perkins, Pilkey, and Schlesinger; Associate Professors Baker and Malin; Assistant Professors Klein and Rojstaczer

A major is available in this department.

The department offers introductory and advanced courses in all branches of the earth sciences including coastal geology, environmental geology, hydrology, geochemistry, geomorphology, geophysics, paleontology, petrography, sedimentology, and marine geology. The degree requirements emphasize a broad knowledge of both geology and the associated physical sciences. An option is available for one semester of study at the Duke University Marine Laboratory in Beaufort, North Carolina, to fulfill elective requirements for the degree.

10S. Analysis of Outcrops. (NS) Field interpretation of geologic features. Includes four field trips. Prerequisite: Geology 41 (may be taken concurrently). Half course. *Boudreau*

41. Introduction to Geology. (NS) Earth composition, processes, and structure. One course. *Baker or Heron*

43S. Application of Geologic Principles. (NS) Mineral and rock classification, topographic and geologic map interpretation. Prerequisite: Geology 41 (may be taken concurrently). Half course. *Staff*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

53. Introductory Oceanography. (NS) Basic principles of physical, chemical, biological, and geological oceanography. Fee for required field trip to the Marine Laboratory. C-L: Biology 53. One course. *Pilkey and Searles (biology)*

72L. History of the Earth. (NS) Evolution of the earth and organisms through time. Weekend field trip to the Appalachian Mountains. Lectures and laboratory. Prerequisite: Geology 41 or consent of instructor. One course. *Corliss or Klein*

105L. Fundamentals of Mineralogy. (NS) Crystal chemistry, crystal physics, mineral identification, and genesis. Lectures or recitations, laboratory, and field trips. Prerequisite: Chemistry 12L (may be taken concurrently). One course. *Klein*

106L. Igneous and Metamorphic Rocks. (NS) Silicate mineralogy, theory of origin and classification of igneous and metamorphic rocks, and rock identification. Lectures and laboratory. Prerequisite: Geology 105. One course. *Boudreau*

109. Climatic Change. (NS) Record of changing climate on earth, as determined from the analysis of deep sea sediments, ice cores, lake sediments, and tree rings. (Given at Beaufort.) C-L: Marine Sciences. One course. *Johnson*

110L. Stratigraphy and Sedimentology. (NS) Age relationships, correlation, classification, identification, origins, and interpretation of sediments. Lecture, laboratory, and field trip. One course. *Heron and Perkins*

120. Environmental Geology. (NS) The relation between the human environment, the properties of earth materials, and the occurrence of geological surface processes such as floods, landslides, and erosion. Prerequisites: Geology 41 and Mathematics 31. One course. *Haff and Rojstaczer*

123. Hydrology. (NS) The hydrologic cycle with particular emphasis on surface water flow and associated sediment transport. Prerequisite: Mathematics 32 or consent of instructor. One course. *Rojstaczer*

130. Principles of Structural Geology. (NS) Description, origin, and interpretation of primary and secondary geologic rock structures. Prerequisites: Geology 106 and 110. One course. *Karson*

145. Invertebrate Paleontology. (NS) Biologic and stratigraphic relationships of invertebrates and their phylogeny. Lectures and laboratory. Prerequisite: Geology 72 or consent of instructor. One course. *Corliss*

151S. Global Change. (NS) Analysis of the causes and geological record of climatic change; emphasis on the Holocene. One course. *Baker*

191, 192. Independent Study. Directed reading or research. Open only to qualified juniors and seniors by consent of director of undergraduate studies and supervising instructor. One course each. *Staff*

195. Independent Study for Nonmajors. Open to qualified juniors and seniors upon approval of the departmental faculty. One course. *Staff*

196S. Beach and Island Geological Processes. (NS) Processes affecting evolution of beaches and barrier islands with emphasis on the effect of constructions. (Given at Beaufort on three weekends.) C-L: Marine Sciences. Half course. *Pilkey*

FOR ADVANCED UNDERGRADUATES AND GRADUATES

200. Beach and Coastal Processes. (NS) The study of sedimentary processes and geomorphology of nearshore environments with emphasis on both developed and undeveloped barrier island systems. One course. *Pilkey*

201S. Coastal Processes. (NS) Waves and currents in the nearshore zone and their role in beach evolution. Linear wave theory and models for beach evolution. Other topics include nearshore currents, tides, estuarine circulation, and field techniques for measurement of nearshore morphology and fluid motions. Term project required. (Given at Beaufort.) Prerequisites: Mathematics 31 and 32. C-L: Environment 222S and Marine Sciences. Half course. *Howd*

203. Physical Oceanography. (NS) Introduction to the dynamic principles of ocean circulation with an emphasis on large temporal and spatial scales of motion. Topics include wind-driven and density-driven flow, western boundary intensification, mid-ocean, shelf, and tropical circulations. Corequisite: Geology 250. Prerequisites: Mathematics 31 and 32 or consent of instructor. C-L: Environment 290, Mechanical Engineering 290, and Marine Sciences. One course. *Lozier*

205S. Geological Oceanography. (NS) The geology of ocean basins, including origin, bottom physiography, sediment distribution, and sedimentary processes. Not open to students who have taken Geology 206S. (Given at Beaufort.) C-L: Environment 291S and Marine Sciences. One course. *Johnson*

206S. Principles of Geological Oceanography. (NS) Geological aspects of the ocean basins including coastal to deep water sediment types and sedimentation processes, sea floor physiography and environmental problems. One course. *Pilkey*

208S. Paleoceanography. (NS) Geology, paleoceanography, and evolution of the oceans, ocean basins, and marine biota based on analysis of deep-sea sedimentary sequences. One course. *Corliss*

209. Climatic Change. (NS) Record of changing climate on earth, as determined from the analysis of deep sea sediments, ice cores, lake sediments, and tree rings. (Given at Beaufort.) C-L: Environment 231 and Marine Sciences. One course. *Johnson*

212. Carbonate Facies Analysis: Recent and Ancient. (NS) Origin, distribution, and diagenetic alteration of recent carbonate sediments and their ancient analogs. Prerequisite: Geology 110L. One course. *Perkins*

215. Clastics Facies Analysis: Recent and Ancient. (NS) Modern clastic depositional systems and their ancient analogs. Prerequisite: Geology 110L. One course. *Heron*

216. Field Analysis of South Florida Carbonates. (NS) A analysis of recent sediments and organisms and their Pleistocene analogs. One-week field trip. Pass/fail grading only. Prerequisite: Geology 110L or consent of instructor. Half course. *Perkins*

218. Geological Fluid Mechanics. (NS) Physical properties of fluids. Continuity, momentum, and energy principles. Laminar and turbulent flow; potential flow; open channel flow. Applications to stream and watershed hydraulics, sediment transport, and other geological phenomena. Corequisite: Geology 250. Prerequisites: Engineering 75L, Mathematics 31 and 32, or Physics 41L and 42L. One course. *Haff*

219. Sediment Transport. (NS) The processes by which wind and water move sedimentary material. Corequisite: Geology 250. Prerequisites: Civil Engineering 122L or Geology 41 and 218. One course. *Haff*

220. Earth Surface Processes and Geomorphology. (NS) The origin, nature, and significance of natural features on the earth's surface. Content varies from year to year. Prerequisites: open to graduates and advanced undergraduates with consent of instructor. One course. *Haff*

221. Hydrogeology. (NS) Theory of groundwater flow and solute transport with application to geologic processes. Corequisite: Geology 250. Prerequisite: Chemistry 12L, Mathematics 103, Physics 42L or 52L, or consent of instructor. One course. *Rojstaczer*

222L. Techniques in Environmental Data Analysis. (NS) Techniques commonly used by environmental scientists for the analysis of spatial and/or temporal series of data. Topics include regression, Fourier analysis, spectral and cross-spectral analysis, and empirical orthogonal functions. Emphasis on developing a hands-on understanding of the methods and correct interpretation of results. (Given at Beaufort.) Prerequisites: Mathematics 31 and 32 (introductory calculus). C-L: Environment 252L and Marine Sciences. One course. *Howd*

223. Numerical Methods in Hydrogeology. (QR) Forward and inverse modeling of groundwater flow and transport. Corequisite: Geology 250. Prerequisite: Computer Science 8 or 53, Geology 221, Mathematics 103, or consent of instructor. One course. *Rojstaczer*

225S. Advanced Topics in Hydrogeology. (NS) Hydrologic controls on the chemical and physical state of the earth's crust. Prerequisite: Geology 221 or consent of instructor. One course. *Rojstaczer*

233S. Oceanic Crust and Ophiolites. (NS) Structure, tectonics, petrology, and geochemistry of oceanic spreading environments and ophiolite complexes. Prerequisites: Geology 106L and 130 or consent of instructor. One course. *Karson*

237S. Structure and Evolution of the Appalachian Orogen. (NS) Overview of sedimentation, deformation, and metamorphism responsible for the development of the Appalachian Mountain Belt from Newfoundland to Alabama in the context of plate tectonics. Prerequisites: Geology 106L, 110L, and 130 or consent of instructor. One course. *Karson*

249. Marine Micropaleontology. (NS) Introduction to marine microfossils, basic principles of micropaleontology and stable isotope geochemistry with applications to paleoceanography. Lectures and laboratory. One course. *Corliss*

250. Mathematical Methods in Geology. (QR) Overview of quantitative methods used in geologic modeling and data analysis. Prerequisites: Geology 41, Mathematics 32, Physics 41L and 42L. One course. *Staff*

251. Introduction to Geophysics. (NS) A survey of the earth's heat flow, gravitational, magnetic, and electrical potential fields, and global seismology. Derivation of basic relationships and their application to the solution of geological problems. Corequisite: Geology 250. Prerequisite: upper-division mathematics or science courses. One course. *Malin*

252. Seismic Exploration of the Lithosphere. (NS) A survey of seismic wave generation, propagation, detection, analysis, and interpretation in the continental and oceanic lithosphere with practical applications to geological and industrial problems. Prerequisites: upper-division mathematics or science courses and Geology 250. One course. *Malin*

255. Theoretical Geophysics I: Diffusion and Wave Motion in the Earth, Part I. (NS) Theoretical and practical quantitative methods for seismological and groundwater research. Differential and integral equations for diffusion and wave motion; analytical solutions and numerical methods. Elementary continuum mechanics. Time series analysis. Emphasis varies depending on enrollment. Prerequisite: enrollment in an advanced degree program in earth sciences or related fields, or consent of instructors. One course. *Malin and Rojstaczer*

256. Theoretical Geophysics II: Diffusion and Wave Motion in the Earth, Part II. (NS) Theoretical and practical quantitative methods for seismological and groundwater research. Differential and integral equations for diffusion and wave motion; analytical solutions and numerical methods. Elementary continuum mechanics. Time series analysis. Emphasis varies depending on enrollment and the contents of Geology 255. Prerequisite: Geology 255 or consent of instructors. One course. *Malin and Rojstaczer*

258S. Advanced Topics in Geophysics: Interdisciplinary Approaches to Problems in Tectonics, Seismology, and the Environment. (NS) Crustal structure of the western United States; use of seismic reflection and microearthquake data for imaging active geological processes, earthquake prediction; scattering of seismic waves. Consent of instructor required. One course. *Malin*

260S. Applied Subsurface Stratigraphy. (NS) Overview and application of tools, techniques, and procedures for analysis of subsurface strata. Logging methods for cuttings and cores, principles and application of wire-line logs, interpretation of seismic sections, mapping and correlation procedures, and the application of computers to stratigraphic analysis. Prerequisite: Geology 110L. One course. *Perkins*

272. Biogeochemistry. (NS) Processes controlling the circulation of carbon and biochemical elements in natural ecosystems and at the global level, with emphasis on soil and surficial processes. Prerequisite: Chemistry 12L or equivalent. C-L: Biology 272. One course. *Schlesinger*

273S. Analytic Techniques. (NS) An introduction to advanced analytic procedures used in the earth sciences: such as electron microbeam techniques (scanning electron microscopy, electron microprobe analysis) and plasma emission/absorption spectroscopy. Consent of instructor required. One course. *Boudreau and Klein*

275. Economic Geology. (NS) Geology and geochemistry of ore deposits. Consent of instructor required. One course. *Baker and Boudreau*

285S. Layered Intrusions. (NS) Survey of layered igneous intrusions and current theories on crystallization and other processes in mafic magmas. Offered alternate years. Prerequisites: Geology 105L and 106L or consent of instructor. One course. *Boudreau*

292. Computer Methods in Geology. (NS) Techniques used in the geological sciences including simulation and forward modeling, inverse and least squares methods, statistical methods and exploratory data analysis as well as graphics. Prerequisites: Computer Science 53 and Mathematics 32, or consent of instructor. One course. *Staff*

295S. Advanced Topics in Geology. (NS) Topics, instructors, and credits to be arranged each semester. Variable credit. *Staff*

COURSES CURRENTLY UNSCHEDULED

45. Earth Resources. (NS)

214S. Sedimentary Petrography. (NS)

217. Field Analysis of Ancient Sedimentary Sequences. (NS)

230S. Advanced Topics in Structural Geology and Tectonics. (NS)

236S. Lithosphere Plate Boundaries. (NS)

269. Theoretical Geochemistry. (NS)

270. Sedimentary Geochemistry. (NS)

271. Isotope Geochemistry. (NS)

283S. Experimental Methods in Geology. (NS)

THE MAJOR

For the A.B. Degree in Geology: Earth Sciences

The A.B. degree in geology is designed to be a flexible major for those students whose interest is in the professional fields allied to geology (for example, land use planning, resources management, environmental law, engineering geology, or secondary education), but who do not plan on pursuing advanced studies in the earth sciences or becoming professional geologists.

Prerequisites. Geology 10 (half course), 41, 43S (half course), and 72; Chemistry 11L and 12L, or Mathematics 31 and 32, or Physics 41L and 42L, or 51L and 52L, or Physics 53L and 54L.

Major Requirements. Geology 105 and five 100-level courses or above, at least three in geology, that are in some way related to the student's interest and approved in advance by the student's advisor.

For the B.S. Degree

The Department of Geology offers *three* programs:

Geology: Preparatory to Advanced Studies in Geology

The B.S. degree in geology provides a strong background for graduate work in the earth sciences for those who wish to become academic or professional geologists in any of its many subfields.

Prerequisites. Geology 41 and 72L; Chemistry 11L and 12L; Mathematics 31 and 32; Physics 41L and 42L or Physics 51L and 52L.

Major Requirements. Required courses include Geology 105L, 106L, 110L, 130, a field course normally taken during the summer after the junior year, and four geological electives above Geology 100.

Additional recommended courses. Although it is not a specific requirement, students interested in advanced studies in the following fields should consider taking the additional courses during their undergraduate career while at Duke with the advice of their faculty advisor. Students interested in advanced studies in *geochemistry*, *hydrogeology*, *petrology*, or *structural geology* should consider taking the following additional courses: introductory statistics, second-year mathematics (ordinary differential equations, linear algebra), computer programming, and physical chemistry. Students interested in advanced studies in *geophysics* should consider taking the following additional elective geology courses: Geology 251, 255, 256, and 258. In addition, they should consider taking courses in classical mechanics, electricity and magnetism, second-year mathematics (ordinary differential equations, linear algebra), and mathematical physics. Students interested in advanced studies in *paleontology* should consider taking the following additional elective geology courses: Geology 145, 208, and 249. They should also consider taking additional courses in introductory statistics, and postintroductory courses in anatomy, biology, botany, and ecology.

Geology: Preparatory to Advanced Studies in Environmental Earth Sciences

For this B.S. degree interested students may work with departmental faculty members to plan a specialized course sequence in a variety of areas relating to environmental earth sciences. Areas of specialization include coastal studies, global change, hydrology, earth surface processes (geomorphology), and environmental geology. Courses in these areas can be combined with related courses in departments such as Civil and Environmental Engineering, Botany, Zoology, and the School of the Environment to create an educational experience tailored to individual student interests.

Prerequisites. Geology 41 and 72L; Chemistry 11L and 12L; Mathematics 31 and 32; Physics 41L and 42L, or Physics 51L and 52L, or Physics 53L and 54L.

Major Requirements. Geology 105, Geology 120, and five additional courses selected from the following with approval of the student's advisor: Geology 106L, Geology 109, Geology 110L, Geology 123, Geology 130, Geology 196, Geology 200, Geology 219, Geology 221, Geology 249, Geology 257, Geology 269, Geology 270, Geology 272, Geology 273, Geology 275, and Biology 216L. Of these five, the student may substitute up to two courses in geology or in other departments, with permission of the student's departmental advisor.

Additional recommended courses. Students interested in advanced studies in *environmental earth sciences* should consider taking additional courses in the following fields: introductory statistics, second-year mathematics (ordinary differential equations, linear algebra), computer programming, and advanced chemistry. Students interested in *field research* are strongly urged to take a geology field course normally the summer of their junior year, but should note that summer field camps usually require Geology 106L, 110L, and 130 as prerequisites.

Geology: Preparatory to Advanced Studies in Oceanography

The B.S. in Oceanography is designed for those who wish to pursue advanced studies in oceanography and geological oceanography.

Prerequisites. Geology 41, 72L, and Geology 53 or 206S; Chemistry 11L and 12L; Mathematics 31 and 32; Physics 41L and 42L, or Physics 51L and 52L; and two full-course science electives.

Major Requirements. A minimum of five geology courses above the introductory level, including Geology 105L, 106L, 110L, and 130.

Additional recommended courses. Although it is not a requirement, students interested in advanced studies in *oceanography* should consider taking the following additional courses with the advice of their faculty advisor: introductory statistics, second-year mathematics (ordinary differential equations, linear algebra), computer programming, organic and physical chemistry.

Honors/Distinction

The department through Trinity College offers Latin honors by honors project and graduation with distinction by honors project.

A candidate for Trinity College Latin honors by honors project must have an overall grade point average of 3.3 and a departmental grade point average of 3.5 at the beginning and end of the project to qualify for departmental nomination. The student will apply for consideration in the honors program by the end of his or her junior academic year by writing a letter of intent to the director of undergraduate studies. A committee of three faculty members, including the director of undergraduate studies, will review the student's record and decide to admit or reject the application. If the student is accepted, a faculty member within the department will be assigned to work with the student as an advisor to the honors project. This project will consist of an original piece of scientific research which will be summarized by a written report in the style of a scientific publication in geology before the end of classes of the final semester. The student will normally do the work as part of an independent study course (Geology 191, 192), but it may be part of other course work as well. The student will also make an oral presentation to students and faculty of the department before the end of classes of the final semester. The decision on granting honors will be made by a vote of the faculty, with a majority in favor needed to grant honors. Students who are not granted honors will receive credit for the independent study. For the graduation with distinction program a candidate must have a departmental average of 3.0 at the beginning and end of the project to qualify; the procedures are otherwise identical to those listed above for Latin honors by honors project.

Teacher Certification

A geology major who is interested in teaching in secondary schools is encouraged to earn a Comprehensive Science teaching certificate in addition to the bachelor's degree. The teaching certificate, which is earned by fulfilling requirements prescribed by the state of North Carolina, is generally accepted in most of the fifty states by reciprocal agreement.

In addition to completion of any of the geology major tracks as described above (the A.B. option is particularly suited for those interested in a teaching certificate), the requirements for the Comprehensive Science teaching certificate include course work in biology, chemistry, physics, an appropriate course in psychology, and several courses in education. The last semester of the senior year is devoted to the student-teaching block, including two special, accelerated courses and ten weeks of full-time teaching and observation in the schools, working with a certified teacher and with Duke faculty. Anyone considering secondary school teaching should confer with the director of undergraduate studies as well as Professor Malone in the Program in Education as soon as possible.

Germanic Languages and Literature

Professor Rolleston, *Chair*; Assistant Professor Bessent, *Director of Undergraduate Studies and Supervisor of Freshman Instruction*; Professors Alt and Borchardt; Associate Professor Morton; Assistant Professors Hell, Rasmussen, and Risholm; Professor Emeritus Phelps; Lecturers Dowell and Johns

A major is available in this department.

GERMAN (GER)

Language

1-2. **Elementary German.** (FL) Practice in understanding, speaking, reading, and writing. Classroom techniques are combined with those of the language laboratory and the computer. Two courses. *Bessent and staff*

14. Intensive German. (FL) Accelerated introduction to German, combining in one semester the work of German 1-2. Classroom theory and practice with extended exposure to language laboratory and computer programmed instruction. Consent of director of undergraduate studies required. Two courses. *Staff*

15. German for Reading Knowledge. (FL) Foundations of German grammar and syntax; emphasis on vocabulary and complex verbal structures. Not open for credit to students who have completed German 1-2, 14, or the equivalent. Students continuing German after German 15 should take the placement test. One course. *Staff*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

German 66, 67, and 69 are usually followed by 100S, 117S, 121S, or 122S.

65-66. German in Review. (FL) Grammar review, reading of literary and cultural texts, oral practice, laboratory, and computer programmed instruction. Not open to students who have had German 63. Prerequisite: for German 65-66, German 1-2, 14, or equivalent; for German 66 alone, appropriate placement test score or consent of instructor. Two courses. *Dowell*

67. Intensive Intermediate German. (FL) Intensive grammar review and practice of spoken and written German combining in one semester the work of one year of intermediate German. Taught only in the Berlin Fall Semester Program. Prerequisite: German 1-2, 14, or equivalent. Two courses. *Staff*

69. Accelerated Intermediate German. (FL) Intensive grammar review covering principles of syntax, expanded vocabulary and use of idiomatic expressions in the context of reading, speaking, and writing. Consent of instructor required. Prerequisite: German 1-2, 14, or equivalent. One course. *Dowell*

99. Introduction to German. Course credit for a score of 4 or 5 on the College Board Advanced Placement tests in German. One course.

100S. Business German. (FL) Introduction to the language of commerce and industry; modes of expression for technology and marketing. Consent of instructor required. One course. *Staff*

117S, 118S. German Conversation and Composition. (FL) Primarily conversation with oral and written reports, based on works by contemporary writers. Required for German majors; other students by consent of instructor. One course each. *Bessent, Dowell, or Johns*

Literature and Culture

121S, 122S. Introduction to German Literature. (AL, FL) Principal authors, genres, concepts, and works of German literature. 121S: Middle Ages to the Baroque. 122S: Enlightenment to the present. One course each. *Staff*

123S, 124S. Undergraduate Seminars. (AL, FL) Topics vary. One course each. *Staff*

125S. Literature of Tolerance. (AL, FL) The liberal tradition in German letters from the Reformation through the Enlightenment to the twentieth-century religious and political dissent. One course. *Borchardt*

130S. From Enlightenment to Classicism. (AL, FL) The major literary and cultural movements of the eighteenth century: Enlightenment, sentimentalism, *Sturm und Drang*, Weimar classicism. Representative works of Lessing, Klopstock, Herder, Goethe, Schiller, and Lenz. One course. *Morton*

131S. The Novelle. (AL, FL) The unique German prose genre from Tieck, Kleist, Grillparzer, Keller, Droste-Hülshoff to Hauptmann, Kafka, and Grass. History and theories from romanticism to naturalism. One course. *Alt, Bessent, or Morton*

132S. The Märchen. (AL, FL) Fairy tales as literary genre; historic relevance, function, types of Märchen from Volksmärchen (brothers Grimm) to Kunstmärchen (Goethe, Brecht, Bichsel) to the anti-Märchen (Karsunke, Gilbert). One course. *Bessent*

136S. Contemporary Germany. (AL, FL) The current literary scene in its cultural, social, and political contexts. C-L: Comparative Area Studies. One course. *Bessent or Hell*

137S. Introduction to Twentieth-Century German Women Writers. (AL, FL) This century's preeminent German women writers placed in historical and cultural context. Elementary concepts of literary analysis; emphasis on speaking and writing German. Readings in Bachmann, Seghers, Wolf. Other authors may include: Aichinger, Fleisser, Frischmuth, Kaschnitz, Leutenegger, Morgner, H. Müller, Rinser, Struck. C-L: Women's Studies. One course. *Hell or Rasmussen*

199S. Senior Seminar in German Studies. (CZ) See C-L: Interdisciplinary Course 199S. One course. *Rolleston and staff*

Courses Taught Overseas

119S. Advanced German Language and Culture. (CZ, FL) Advanced grammar review with emphasis on phonetics and conversation, literature, films, museums, and theater performances. Taught only in the Berlin program. Fulfills requirements for German 117S and 118S. Prerequisite: German 65-66, or German 67 or 69. Two courses. *Staff*

150. Composition. (FL) Syntax with practice in the elements of German expository style. Offered as a part of the summer program at the University of Erlangen. One course. *Staff*

151S. Advanced Intensive German. (FL) For advanced students to increase all four language skills: comprehension, speaking, reading, and writing. Discussion of current events based on newspaper articles, radio and television reports. Preparation for the German language examination required of all foreign students enrolling at German universities. Equivalent of German 117S or 118S but offered only in the Berlin semester program. One course. *Staff*

152S. Berlin in Literature and Culture. (AL, FL) Literary works of modern German writers; focus on the city of Berlin and its unique cultural and political heritage due to Germany's division from 1945-1989. Emphasis on art and architecture of Berlin reflecting both historical trends and political ideologies such as National Socialism and Marxism. Taught only in the Berlin semester program. C-L: Comparative Area Studies. One course. *Wohlfeil*

153. Aspects of Contemporary German Culture. (CZ, FL) Site visits, lecture, and discussion. Offered as part of the summer program at the University of Erlangen. C-L: Comparative Area Studies. One course. *Staff*

Courses Taught in English

123A, S. Special Topics. Taught in English by visiting faculty. One course. *Staff*

160. German Life and Thought. (CZ) A survey of what the well-educated German knows about German-speaking Europe, from antiquity to the present, with a stress on generally less familiar periods. Architecture, art, education, literature, music, philosophy, and science. Taught in English. C-L: Comparative Area Studies. One course. *Borchardt*

174S. In Search of the Self: The German *Bildungsroman*. (AL) The German novel of development of character (*Bildungsroman*), from the eighteenth to the twentieth century; its role in shaping modern prose fiction. Readings in Goethe, Hölderlin, Mann, and Hesse; also Dickens, Twain, Joyce, and Proust. Taught in English. One course. *Morton*

180. *Faust* and the Faust Tradition. (AL) Goethe's great work in the context of its intellectual and cultural inheritance and legacy. Taught in English. One course. *Borchardt* or *Morton*

184S. Rilke, Kafka, Mann, Brecht. (AL) The shaping of twentieth-century thought by those literary figures whose writing has become world literature. Taught in English. One course. *Borchardt, Morton, or Rolleston*

Independent Study and Honors Seminars

191, 192. Independent Study. Directed reading and research. Open only to qualified students in the junior year, by consent of the director of undergraduate studies. One course each. *Alt, Bessent, Borchardt, Hell, Morton, Rasmussen, Risholm, or Rolleston*

193, 194. Independent Study. Directed reading and research. Open only to qualified students in the senior year, by consent of the director of undergraduate studies. One course each. *Alt, Bessent, Borchardt, Hell, Morton, Rasmussen, Risholm, or Rolleston*

197S, 198S. Honors Program Sequence. (AL, FL) 197S: Senior Colloquium; team taught. 198S: Preparation and writing of research paper. See section on *Honors* under description of the major. One course each. *Staff*

For Graduates and Advanced Undergraduates

200S. Proseminar: Introduction to Literary Criticism. (AL, FL) Literary theory within the framework of Germanistik, combining a survey of the major critical approaches which developed after 1945 with the discussion of several paradigmatic readings of literary texts. Approaches studied include New Criticism, hermeneutics, Marxist critical theory, reception aesthetics, structuralism, poststructuralism, and feminist literary criticism(s). One course. *Hell*

201. Introduction to Middle High German: The Language of the German Middle Ages and Its Literature. (AL, FL) Fundamentals of medieval German language acquired through readings in the original Middle High German of Arthurian romance, heroic epic, and courtly poetry. C-L: Medieval and Renaissance Studies. One course. *Rasmussen*

202S. Medieval Seminar. (AL, FL) Topics may include: heroic epic, courtly epic, medieval poetics, German lyric poetry from the twelfth to the fifteenth century. Solid reading knowledge of modern German and some knowledge of medieval German required. C-L: Medieval and Renaissance Studies. One course. *Rasmussen*

203S. Sex, Gender, and Love in Middle High German Literature. (AL, FL) Historical contexts for emergence of courtly love and the role of desire and interpretation in Gottfried von Strassburg's *Tristan und Isolde*, courtly love lyric, "maere." C-L: Medieval and Renaissance Studies. One course. *Rasmussen*

210S. Renaissance and Reformation. (AL, FL) The development of "personality" from "type" to "individual" in German culture in the great transition from medieval to early modern times, with examples from literature, history, art, architecture, music, science, and religion. Emphasis on the Italian connection, northern mysticism, Prague in the fourteenth century, fifteenth-century poetry and prose, and Luther. C-L: Medieval and Renaissance Studies. One course. *Borchardt*

220S. Reason and Imagination: The German Eighteenth Century. (AL, FL) Advanced study of selected topics, from the beginnings of Enlightenment to the transition to Romanticism. One course. *Morton*

225S. Introduction to Goethe. (AL, FL) Major works of lyric, narrative, drama, and theory, throughout Goethe's career. One course. *Morton*

226S. Goethe's *Faust*. (AL, FL) Goethe's masterpiece and life's work, conceived as a summation of Western literature and mythology for the modern age. One course. *Morton*

227S. Goethe Seminar. (AL, FL) Selected texts or other aspects of Goethe's life and work not treated in German 225S or 226S. Topics may include autobiography, scientific writings, longer novels, late lyrics, literary theory and criticism, as well as others. One course. *Morton*

229S. Schiller: Aesthetic Theory and Practice. (AL, FL) The nature and function of the artist and the work of art, in Schiller's essays, poetry, and dramas. One course. *Borchardt, Morton, or Rolleston*

230S. German Romanticism. (AL, FL) The emergence in the 1790s of a new cultural language: categories of self, history, interpretation, irony, and revolution. Theory, fiction, and poetry by Novalis, the brothers Schlegel, Tieck, Brentano, Eichendorff, Hoffmann, and Heine. One course. *Rolleston*

232S. The Lyric: Goethe to the Present. (AL, FL) Poetry and its cultural meanings from versions of the modern *Ich* generated by Goethe, Hölderlin, and the romantics to the ironic new subjectivity of the 1970s. Emphasis on Mörike, Heine, Droste-Hülshoff, Rilke, Benn, Celan, Enzensberger, and Karin Kiwus. One course. *Rolleston*

233S. German Theater as Anti-Drama. (AL, FL) The story of modern and postmodern drama with emphasis on Lenz, Büchner, Grabbe, Schnitzler, Brecht, Frisch, Dürrenmatt, Handke, expressionist drama, and Piscator's political theater. C-L: Drama 220S. One course. *Alt*

235S. Nineteenth-Century German Literature. (AL, FL) Topics vary: poetry, prose, drama; Kleist, Heine, Büchner, Keller, Meyer, Gotthelf, Grillparzer, Mörike, Storm, Freytag, Hebbel, Fontane. One course. *Alt*

245S. The Twentieth Century. (AL, FL) The major movements and writers from the expressionists, Thomas Mann, Kafka, Rilke, and Brecht, to Böll, Grass, Handke, and Christa Wolf. Emphasis on relations between text and history: World War I, Weimar, Third Reich, and the struggle to integrate past and present in post-Holocaust literature. One course. *Rolleston*

246. German Letters in the Third Reich and in Exile. (AL, FL) German literature, drama, and film inside and outside Nazi Germany. Theoretical readings in Bloch, Benjamin, and others. One course. *Hell*

247S. Postwar German Literature. (AL, FL) The development of German literature after 1945. Topics vary: German literature between 1945 and the founding of the two states; the GDR novel and the question of realism; GDR drama after Brecht; West German literature. One course. *Hell*

250S. German Literature and Classical Antiquity. (AL, FL) The reception of Greece and Rome in German letters; the triumph and decline of classical rhetoric; the idea of the "classical"; antiquity as model and reproach. One course. *Borchardt*

Linguistics

260. History of the German Language. (FL) Phonology, morphology, and syntax of German from the beginnings to the present. C-L: Linguistics and Medieval and Renaissance Studies. One course. *Rasmussen*

261. Second-Language Acquisition Theory and Practice. (FL) Modern teaching techniques; problems in the teaching of German on the secondary and college levels. Analysis and evaluation of textbooks, related audiovisual materials, and computer programs. One course. *Staff*

262. Applied Linguistics. (FL) The application of modern linguistic principles to a systematic study of the phonetics, morphology, and syntax of modern German. C-L: Linguistics. One course. *Staff*

Courses Taught in English

244A, S. International Expressionism. (AL) Not open to students who have taken Art 244S or German 244S. See C-L: Art 244A. One course. *Cernuschi and Rolleston*

244B, S. International Modernism. (AL) See C-L: Art 244B. One course. *Cernuschi and Rolleston*

270. Consciousness and Modern Society. (CZ) The blend of philosophy, literature, and sociology in German thinking about actual and possible societies. The idea of consciousness as producing involvement, detachment, or transformation. Marx, Nietzsche, Lukacs, Freud, Marcuse, Benjamin, Adorno, and Habermas. Taught in English. C-L: Comparative Area Studies. One course. *Rolleston*

Courses Currently Unscheduled

135. German Literature and the Media. (AL, FL)

154. Deutsche Kulturgeschichte. (CZ, FL)

164S. Medieval German Literature. (AL)

165S. The Vikings and their Literature. (AL)

170S. The German Enlightenment and the Invention of Modernity. (AL)

185S. The Golden 'Twenties. (AL)

215S. German Baroque Literature. (AL, FL)

231S. Romantic Outsiders. (AL, FL)

236S. Empires of the Mind: Nineteenth-Century German Ideas. (AL, FL)

240S. Naturalism and Beyond: The Turn of the Century. (AL, FL)

241S. Nietzsche. (AL, FL)

242S. Expressionism. (AL, FL)

251S. Germanic Mythology and Its Critics. (AL, FL)

252S. The Mystical Tradition. (AL, FL)

253S. The Image of America in German Literature. (AL, FL)

254S. Literature by Women. (AL, FL)

255S. Paradigmatic Issues in Literary Theory. (AL, FL)

271S. Contemporary Theory and the German Tradition. (AL)

272S. The German Literature of Fantasy. (AL)

273S. Franz Kafka and Thomas Mann. (AL)

274S. The Image of America in German Literature. (AL)

275S. German Women Writers. (AL)

YIDDISH (YDH)

1, 2. Elementary Yiddish. (FL) A thorough study of elementary Yiddish grammar with reading, composition, and oral practice. No previous knowledge of German or Hebrew required. C-L: Judaic Studies. One course each. *Staff*

170. Special Topics in Literature and the Judaic Tradition. (AL) See C-L: Literature 131; also C-L: Judaic Studies. One course. *Staff*

Courses Currently Unscheduled

171. Yiddish Fiction in Translation. (AL)

191, 192. Independent Study

THE MAJOR

Students majoring in German develop language skills in their cultural and literary context. The international and humanistic emphasis makes the German major an appropriate companion to technical and career-oriented concentrations. Numerous opportunities are available, including programs of study abroad, interdisciplinary programs, and Fulbright and German Academic Exchange Service (DAAD) scholarships.

Prerequisites. Elementary and intermediate German.

Major Requirements. Conversation and composition (German 117S, 118S, or equivalent), plus six advanced courses, three of which must be at the 200 level. German 121S or 122S is required as part of the six-course sequence. Of the courses taught in English, either German 160 or 270 (but not both) may count toward the major.

Honors/Distinction. Qualified students (see the section on honors in this bulletin) may apply or be invited to apply for graduation with distinction or to achieve Latin honors by project. The application deadline is preregistration for the fall semester of the senior year. Further information may be obtained from the director of undergraduate studies or the departmental honors representative.

Greek

For courses in Greek, see Classical Studies.

Health, Physical Education, and Recreation (PE)

Professor Buehler, *Chair*; Associate Professor Spangler, *Director of Undergraduate Studies*; Associate Professors Harvey, LeBar, Raynor, Skinner, and Woodyard; Part-time Instructors Beguinet, Bowen, D. Coffman, T. Coffman, Falcone, Forbes, Gaudet, Hagymas, Hillier, Hopkins, Jindra, Ogilvie, Orr, Rollins, Spector, Trout, Wilson, and Yakola

Courses in this program do not count toward distributional requirements.

ACTIVITY COURSES

The activity courses listed below may be taken by men and women unless otherwise indicated. Each course carries a half-course credit and is given on a pass/fail basis. The

maximum amount of credit that counts for the undergraduate degree is one full course, but additional courses may be taken without credit toward graduation. Students may repeat activity courses but will not receive credit for the repeated courses.

11. Cardiorespiratory Conditioning and Aerobics. Individualized programs in walking, jogging, running, cycling, and swimming. Half course. *Buehler*

12. Dancing for Health. Dancing for cardiovascular and physical conditioning. Half course. *Jindra*

13. Weight Control. Individualized exercise and diet programs. Consent of physician required. Half course. *Staff*

14. Tension Control. Techniques for recognizing and reducing tension. Half course. *Staff*

15. Weight Training. Progressive, cumulative, and measurable physical conditioning. Half course. *Harvey*

16. Endurance Swimming. Individualized programs to improve skills and fitness. Half course. *Spangler*

20. Beginning Swimming. Propulsion techniques, water safety, introduction to the five basic strokes. Half course. *Spangler*

21. Intermediate Swimming. Development of the five basic strokes, overarm side trudge, and trudge crawl. Half course. *Spangler*

22. Lifeguard Training. American Red Cross course which prepares an individual to qualify as a *non-surf* lifeguard. Preventative lifeguarding, emergencies, health and sanitation, water rescue and special situations, search and recovery operations, weather and environmental conditions. Corequisites: must have CPR and Red Cross Standard First Aid certification by the end of the course in order to receive Lifeguard Training certification. Half course. *Forbes*

24. Basic Rescue and Emergency Water Safety. Prerequisite for Water Safety Instructors Course. Half course. *Woodyard*

25. Water Safety Instructors Course. American Red Cross Water Safety Instructors certification. Prerequisite: Physical Education 24. Half course. *Woodyard*

27. Kayaking. Basic skills for kayaking in whitewater. Half course. *Harvey*

28. Canoeing. Basic skills for canoeing in whitewater. Half course. *Staff*

29. Water Polo. Prerequisite: Physical Education 16 or consent of instructor. Half course. *Forbes*

30. Beginning Golf. Half course. *T. Coffman*

31. Intermediate Golf. Stroke development and use of all clubs. Half course. *T. Coffman*

32. Advanced Golf. Use of all clubs; course strategy. Emphasis on playing. Half course. *T. Coffman*

35. Beginning Racquetball. Half course. *Skinner*

36. Intermediate Racquetball. Strategy of the game; stroke development. Half course. *Skinner*

37. Advanced Racquetball. Development of competitive skills. Half course. *Skinner*

- 40. Beginning Tennis.** Half course. *LeBar*
- 41. Intermediate Tennis.** Strategy of the game and stroke development. Half course. *LeBar*
- 42. Advanced Tennis.** Stroke development with emphasis on strategy. Half course. *LeBar*
- 48. Men's Competitive Tennis.** High level drills, strategy, mental and physical conditioning for those interested in tennis competition. Half course. *LeBar*
- 50. Mixed Competitive Tennis.** See Physical Education 48. Half course. *LeBar*
- 52. Fencing.** Foils, épée, and saber. Half course. *Beguinet*
- 53. Intermediate Fencing.** Further study of basics and theory. Half course. *Beguinet*
- 55. Self-Defense: Karate.** Fundamentals of selected martial arts. Half course. *Bowen*
- 56. Intermediate Karate.** Continued practice of basic technique. Introduction to round kick, back kick, free sparring, four Pinan Katas of the Wadoryu System. Half course. *Bowen*
- 59. Aikido.** A method of unarmed self-defense that encourages discipline and a nonviolent attitude. Half course. *Bowen*
- 60. Volleyball.** Half course. *Hopkins*
- 62. Intermediate Aikido.** A method of unarmed self-defense combining movements taken from sword and spear fighting, jujitsu, and aikijitsu. Half course. *Bowen*
- 65. Yoga.** Traditional hatha yoga combined with balanced structural alignment to develop strength, flexibility, and mental concentration. Half course. *Orr or Spector*
- 66. Intermediate Hatha Yoga.** Continuation of hatha yoga postures and awareness of breathing to develop more flexibility and calmness. Yoga philosophy. Prerequisite: previous experience with yoga. Half course. *Orr*
- 71. Country/Western Dancing.** Texas two-step, East Coast swing, cha-cha, waltz, and country line dancing. Half course. *Trout*
- 72. Social Dancing.** Waltz, foxtrot, tango, cha-cha, rumba, jitterbug, rock, disco, and others. Half course. *Trout*
- 73. Intermediate Social Dance.** Review of dances in Physical Education 72. Advanced movements in these dances and beginning movements in slow dancing, California two-step, and West Coast swing. Introduction to international and modern ballroom dance. Prerequisite: Physical Education 72 or equivalent. Half course. *Trout*
- 80. Equitation.** Skills in balance seat riding: walk, trot, and canter. Half course. *Rollins*
- 81. Advanced Equitation: Hunt Seat.** Cross-country and stadium jumping techniques. Half course. *Rollins*
- 96. Basketball.** Development of individual and team skills. Half course. *Hillier*
- 98. Frisbee.** Study of basic throwing and catching skills, introduction to rules and tactics of ultimate frisbee, disc golf, freestyle moves, and individual event techniques. Half course. *Staff*

THEORY COURSES

- 49S. First-Year Seminar.** Topics vary each semester offered. One course. *Buehler*

100. **Advanced First Aid and Cardiopulmonary Resuscitation.** Certification in advanced first aid and CPR. Half course. *Raynor*

115. **Care and Prevention of Athletic Injuries.** Basic instruction in prevention, recognition, care, and rehabilitation of athletic related injuries. Half course. *Staff*

120. **Theory and Practice of Coaching.** Fundamentals, strategies, and psychology of coaching. Emphasis on basketball, and track and field. Additional topics such as safety and liability, gender equity, the media, regulations and ethics. One course. *Gaudet*

150. **Health, Fitness and Wellness.** Relationships among health, wellness, exercise, nutrition and fitness. Scientific evidence pertaining to diet and nutrition, weight control, cardiovascular and strength fitness, stress management, tension control, and drugs and alcohol. Development of a personal lifetime fitness program. One course. *LeBar*

170. **History and Issues of Sports.** Sports from ancient to modern times with an emphasis on sports in America. Not open to students who have taken this course as Health, Physical Education, and Recreation 49S. One course. *Buehler*

172. **Administration in Sports Management.** Philosophy, financial structure, administrative structure, fund-raising, NCAA legislation, personnel decision, and scheduling events. One course. *Alleoa or Buehler*

COURSES CURRENTLY UNSCHEDULED

26. Scuba Diving

70. Folk Dancing

93. Orienteering

95. Wilderness Skills

110. Diet and Nutrition

112. Sexuality, Stress, and Substance Abuse: Choices, Risks, and Consequences

Health Policy Program

Assistant Professor Sprinkle, *Director*

A certificate, but not a major, is available in this program.

The Health Policy Certificate Program offers undergraduates an opportunity to gain certification for successful completion of a sequence of courses dealing with a range of health-policy topics.

Undergraduate candidates fulfill program prerequisites by passing basic courses in both economics and policy analysis. They then earn certification by completing:

—two of six core courses (see * below)

—any one other “Background,” “Methods,” or “Applications” course, and

—Public Policy Studies 255, Health Policy Analysis, an integrative group project.

Formal entry into the program normally occurs at approximately the same time the student selects a major. However, certification also is available to undergraduates who have completed program requirements before formal entry into the program, assuming they are still able to enroll in Public Policy Studies 255, Health Policy Analysis.

Course selection is advised and approved by a designated member of the program faculty. Program requirements can be adapted to changes in course availability and to exceptional individual circumstances.

General Prerequisites

Economics 2D or 52D. Competition, Monopoly, and Welfare. *Staff*

Public Policy Studies 55D. Analytical Methods for Public Policy-Making. *Staff*

Background Courses

Cultural Anthropology 145. Medical Anthropology. *Staff*
History 189. Medicine in the West. *Green*
History 199. The History of Women in Science and Medicine. *Green*
History 279, 280. Health, Healing, and History. *English*
Philosophy 118. Philosophical Issues in Medical Ethics. *Cooper*
Psychology 109. Health Psychology: Introduction and Survey. *Anderson or Gil*
Religion 157. Bioethics in Contemporary Contexts. *McCullough*
Religion 159. Ethical Issues in Health Care. *McCullough*
Sociology 162. Health and Illness in Society. *Weinberger*

Methods Courses

Biometry 217. Medical Decision Analysis: What Does Clinical Research Have to Do with Clinical Practice? *Matchar*

*Economics 156. The Economics of Health Care. Prerequisite: Economics 2D or 52D. *Sloan*

Economics 215S. Applied Cost Benefit Analysis. Prerequisite: Economics 149. *Staff*

*Public Policy Studies 253. The Politics of Health Care. (Not available to undergraduates who have taken Public Policy Studies 157S.) *Sprinkle*

Public Policy Studies 256. The Economics of Health Care. Prerequisite: Economics 2D or 52D or 149 or Public Policy Studies 110. (Not available to undergraduates who have taken Public Policy Studies 157S.) *Sprinkle*

Public Policy Studies 261. Evaluation of Public Expenditures. (C-L: Economics 285.) *Staff*

Applications Courses

Food-and-Hunger Courses

One of the following may be counted:

Political Science 176A. (C-L: Interdisciplinary Course 120A.) Perspectives on Food and Hunger. *Johns*

Political Science 176B. (C-L: Interdisciplinary Course 120B.) Perspectives on Food and Hunger. *Johns*

Law 337. Health Care Law and Policy. (Open to limited undergraduate enrollment with consent of instructor.) *Havighurst*

*Public Policy Studies 157S. Health Policy. (May not be counted as a core course by students who have taken Public Policy Studies 253: The Politics of Health Care.) *Henderson-James*

Public Policy Studies 158S. Health Policy Summer Internship. (Must be preceded by Public Policy Studies 157S; does not count as a full course.)

Public Policy Studies 251S.01. Regulation of Vice and Substance Abuse. *Cook*

*Public Policy Studies 264S.07. Rationing Medical Care. Prerequisite: Economics 52D or 149 or Public Policy Studies 110. (May not be counted as a core course by undergraduates who have taken Economics 156.) *Lipscomb*

Public Policy Studies 264S.53. Science and Technology Policy. *Sprinkle*

Sociology 123. Social Aspects of Mental Illness. *Reed*

Sociology 163. Aging and Health. *Gold*

*Sociology 171. Comparative Health Care Systems. (Alternate years beginning fall 1993. May not be counted toward certificate if Sociology 227C is counted.) *Maddox*

Sociology 227C. Organization and Financing of Health Care. (Alternate years beginning fall 1992. May not be counted toward certificate if Sociology 171 is counted.) *Maddox*

Integrative Course

Public Policy Studies 255. Health Policy Analysis. (A group project for undergraduates only.) *CHPRE faculty*

For further information, inquire at the Center for Health Policy Research and education, Suite 125 Old Chemistry Building.

Hebrew

For courses in Hebrew, see Asian and African Languages and Literature.

Hindi-Urdu

For courses in Hindi-Urdu, see Asian and African Languages and Literature.

History (HST)

Professor Chafe, *Chair*; Professor Gordon, *Director of Undergraduate Studies*; Professors Cahow, Cell, Davis, Dirlik, Durden, Gaspar, Gavins, Goodwyn, Herrup, Hewitt, Keyssar, Kuniholm, Lerner, Mauskopf, M. Miller, Oates, Reddy, Richards, Roland, TePaske, Thompson, Witt, Wood, and Wright; Associate Professors English, Ewald, James, Koonz, Nathans, Neuschel, and Robisheaux; Assistant Professors French, Green, Hacothen, Humphreys, Mazumdar, J. Scott, Thorne, and Wigen; Professors Emeriti Colton, Ferguson, Franklin, Holley, Parker, Preston, Ropp, A. Scott, W. Scott, Watson, and Young; Adjunct Associate Professors Roberts and Wilson; Adjunct Assistant Professors Litle and Y. Miller; Visiting Professor Mendelsohn; Lecturer Biddle; Adjunct Lecturer Steen

A major is available in this department.

History courses offer students from all disciplines within the university an opportunity to investigate the past, gain perspective on the present, and improve their critical faculties. History provides an integrating principle for the entire learning process, and students of history gain a sense of human development, an understanding of fundamental and lasting social processes, and a feeling for human interrelatedness. History courses train the mind by improving skills in communicating thought and imagination.

INTRODUCTORY COURSES

Students may benefit from taking at least one introductory course before proceeding to advanced-level courses. Majors take two introductory courses in history (21, 22; 21D, 22D; 21S, 22S; 53, 54; 75, 76; 91, 92; 91D, 92D; 91S, 92S or 93S); History 94 and 98 may not be used to fulfill the introductory course requirement. Additional courses may be chosen from this group as electives or part of the departmental major.

21. Europe to the Eighteenth Century. (CZ) Development and world impact of European civilization, critical evaluation of historical interpretations, and investigation of history from primary sources. One course. *Staff*

21D. Europe to the Eighteenth Century. (CZ) A lecture-discussion version of History 21. One course. *Staff*

21S. Europe to the Eighteenth Century. (CZ) A seminar version of History 21. One course. *Staff*

22. Europe from the Eighteenth Century. (CZ) Development and world impact of European civilization, critical evaluation of historical interpretations, and investigation of history from primary sources. One course. *Staff*

22D. Europe from the Eighteenth Century. (CZ) A lecture-discussion version of History 22. One course. *Staff*

22S. Europe from the Eighteenth Century. (CZ) A seminar version of History 22. One course. *Staff*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

53. Greek History. (CZ) See C-L: Classical Studies 53. One course. *Oates*

54. Roman History. (CZ) See C-L: Classical Studies 54. One course. *Oates*

55. History, Ideas, and Material Life. (CZ) The intellectual and religious life of the fourteenth century presented within the context of the economic, political, and social framework of this period of plague, demographic depression, and economic contraction. Open only to students in the FOCUS Program Medieval and Renaissance Studies. One course. *Witt*

75, 76. The Third World and the West. (CZ) Economic, social, political, and cultural relationships, 1500 to the present. C-L: Comparative Area Studies. One course each. *Ewald, French, Gordon, Little, or Wigen*

91. The Development of American Democracy to 1865. (CZ) The trends vital to an understanding of the United States today. The development of American democracy. Problems of foreign policy, the growth of capitalism, political practices, social reform, and conflicting ideals are considered in relation to this main theme. One course. *Staff*

91D. The Development of American Democracy to 1865. (CZ) A lecture-discussion version of History 91. One course. *Wilson*

91S. The Development of American Democracy to 1865. (CZ) Seminar version of History 91. One course. *Staff*

92. The Development of American Democracy, 1865 to the Present. (CZ) A continuation of History 91 with emphasis upon the emergence of contemporary problems in the United States. Students who have taken History 93S may not receive credit for History 92. One course. *Staff*

92D. The Development of American Democracy, 1865 to the Present. (CZ) A lecture-discussion version of History 92. One course. *Wilson*

92S. The Development of American Democracy, 1865 to the Present. (CZ) Seminar version of History 92. One course. *Staff*

93S. Modern American History. (CZ) Same as History 92, but emphasizing additional topics considered appropriate for the Twentieth-Century America Program (FOCUS). Open only to students in that program. One course. *Staff*

98. Introduction to Canada. (SS) Does not count for introductory course requirements. See C-L: Interdisciplinary Course 98; also C-L: Canadian Studies, Economics 98, Political Science 98, and Sociology 98. One course. *Leclerc or Thompson*

COURSES TAUGHT IN DUKE STUDY ABROAD PROGRAMS

Courses numbered 100 with a letter suffix (100A, 100B . . . 100Z) are lecture courses taught in Duke-administered study-abroad programs, for example, in Germany, Italy, France, China. These courses provide the same credit and fulfill the same curriculum requirements as any 100-level lecture course in the history department.

100A. History of Modern Spain. (CZ) (Taught in fall program in Spain.) Not open to students who have taken History 101L. One course. *Staff*

100B. History of Renaissance Italy. (CZ) (Taught in Italy.) Not open to students who have taken History 182. C-L: Comparative Area Studies and Medieval and Renaissance Studies. One course. *Witt or staff*

100C. Nineteenth-Century European Political History. (CZ) (Taught in France.) One course. *Staff*

100E. Indian History and the Present. (CZ) Overview of medieval and modern Indian history. Emphasis on the creation of a new Indian society emerging from the colonial past. (Taught in Delhi.) One course. *Kumar*

100F. European International Relations, 1859-1914. (CZ) (Taught in France.) One course. *Staff*

100G. Twentieth-Century Economic and Social History of France. (CZ) (Taught in France.) One course. *Staff*

100H. History of France, 1860-1944. (CZ) (Taught in France.) One course. *Staff*

100I. United States/Latin American Relations, 1889-1950. (CZ) (Taught in France.) One course. *Staff*

100J. Foundations of Chinese Civilization. (CZ) (Taught in China.) Not open to students who have taken History 163. See C-L: Cultural Anthropology 163; also C-L: Comparative Area Studies. One course. *Staff*

100K. History of Spain from Late Medieval Times to the Present. (CZ) (Taught in Spain.) Not open to students who have taken History 173. One course. *Staff*

100L. German History from 1870 to 1970. (CZ, FL) Analysis of the major historical, social, economic, and cultural developments of German history, from the founding of the German Reich through the post-World War II period. (Taught in Germany by a faculty member of the Free University of Berlin.) Not open to students who have taken History 188. C-L: Comparative Area Studies. One course. *Staff*

100Q. The United States in Twentieth-Century Japan. (CZ) Particular focus on the era of American occupation of Japan. (Taught in Japan.) One course. *Gordon*

100R. History of Austria. (CZ) Austrian history from 1800-1955 including the Habsburg Monarchy, the wars against Napoleon, Metternich, the democratic revolution in 1848, the roots of World War I, the Anschluss with Nazi Germany, World War II, the Allied occupation and events after the war. Taught in English. Offered only as part of the Duke in Vienna program. One course. *Staff*

100U. Argentine Society in the Era of Juan Domingo Peron. (CZ) (Taught in Argentina.) C-L: Comparative Area Studies. One course. *James*

100V. Actors and Policies in Contemporary Argentine Politics. (SS) (Taught in Argentina.) C-L: Comparative Area Studies. One course. *Torre*

100W. History of Spain I. (CZ) Through the seventeenth century. (Taught in Spain.) One course. *Maldonado*

100X. History of Spain II. (CZ) Eighteenth to the twentieth century. (Taught in Spain.) One course. *Maldonado*

100Y. S. Modern British History: The Political Economy of Decline (1880-1980). (SS) (Taught in Oxford.) Two courses. *Staff*

UNDERGRADUATE COLLOQUIA

Colloquia are open without prerequisite to all undergraduates and are designed for the nonspecialist, although history majors may take them for credit. Each colloquium consists of reading and discussion involving an explicit historical theme. Short papers, reports, and a final examination may be required. Unlike seminars, which emphasize materials and methods of historical research, colloquia concentrate on historical literature.

101C. Terrorism, 1848-1968. (CZ) A comparative analysis of the origins and development of modern terrorism in the West (Europe, Russia, and the United States). C-L: Comparative Area Studies. One course. *M. Miller*

101G, 102G. Introduction to Islamic Civilization. (CZ) See C-L: Interdisciplinary Course 162, 163; also C-L: Comparative Area Studies; Cultural Anthropology 147, 148; Medieval and Renaissance Studies; and Religion 162, 163. One course each. *Cornell, Lawrence, and staff*

101H. Structures, Science, and Society. (CZ) The historical and scientific importance of selected structures. Monuments, buildings, bridges, and machines from Stone-

henge to nuclear reactors. (Taught in summer program in London.) One course. *Mauskopf*

101K. Topics in Chinese Civilization. (CZ) C-L: Comparative Area Studies. One course. *Dirlik*

101M. Asian-Pacific Region in Historical Perspective. (CZ) The emergence of the Asian-Pacific region as a recognizable structure from the nineteenth century onward. Premodern history will be dealt with only to the extent that it is necessary for understanding later developments. The role played by the flow of commodities, people, ideas, and other cultural artifacts. C-L: Comparative Area Studies. One course. *Dirlik*

101N. The Social History of Alcohol. (CZ) The history of the consumption of alcoholic beverages as an aspect of the social history of Western Europe and the United States. One course. *Roberts*

COURSES ON SPECIAL TOPICS

Lecture Courses

Courses numbered 103 or 104 with a letter suffix (103A, 104A; 103B, 104B . . . 103Z, 104Z) are lecture courses on special topics, concerning subject matter which the department does not endeavor to cover on a routine basis. Some will be offered only once and therefore will not appear in the bulletin. If such a course is likely to be offered more than once, it will be listed in the bulletin.

103A. Industrialization Versus Democracy in America, 1875-1975. (CZ) The social and urban consequences of industrialization in America as the nation moved from an agrarian to an urban society and entered the modern era of mass communication. Passage of the family farm, creation of an industrial working class, centralization of commerce and of political structures, and the interaction of these processes to produce political insurgencies and cultural conflicts. The effect of the tensions upon the democratic inheritance. One course. *Goodwyn*

104B. A Survey of Latin American History through Film. (CZ) From the colonial period to the present. C-L: Comparative Area Studies and Film and Video. One course. *TePaske*

Seminar Courses

105S, 106S. Seminars in Selected Topics. One course each. *Staff*

UNDERGRADUATE INTERMEDIATE-LEVEL COURSES

107A, 107B. History of England. (CZ) English history from 1500 to the present in an effort to arrive at a synthesis of ideas, social conditions, and political events. C-L: Comparative Area Studies and Medieval and Renaissance Studies. One course each. *Cell or Herrup*

108C. Canadian-American Relations. (CZ) The Canadian-United States relationship in its diplomatic, military, economic, and cultural aspects from the American Revolution to the present, with emphasis on the twentieth century. C-L: Canadian Studies and Comparative Area Studies. One course. *Thompson*

109. Contemporary Global Issues. (SS) See C-L: Comparative Area Studies 109; also C-L: Cultural Anthropology 109, Political Science 160, and Sociology 175. One course. *Staff*

110. History of Eastern Europe in Modern Times. (CZ) The development of the nations and nationalities of Eastern Europe since the early eighteenth century. C-L: Comparative Area Studies. One course. *Lerner*

111A. Early America to 1760. (CZ) Pre-Columbian explorations, European invasion of North America, the evolution of race slavery, and the responses of the native American peoples. Not open to students who have taken the former History 111. One course. *Wood*

111B. Era of the American Revolution, 1760-1815. (CZ) Origins, evolution, and consequences. Attention to economic, social, and geographical questions, as well as military and political. Not open to students who have taken the former History 112. One course. *J. Scott or Wood*

111C. The United States from the 1890s to 1940. (SS) Economic, social, and political history of the United States from the Populist revolt to the end of the New Deal. Not open to students who have taken the former History 113. One course. *Keyssar*

112A, 112B. The World in the Twentieth Century. (CZ) Imperialism and decolonization, war, revolution, international capitalism and depression, science and technology. 112A: 1900 to 1945; 112B: 1945 to present. One course each. *Cell*

113. Sex, Class, and Victorians. (CZ) An overview of British history from the end of the Napoleonic wars through the outbreak of World War I. Topics include the making of the English working class and the Chartist revolt; mid-Victorian stabilization; middle-class culture, liberalism and reform; the rise of organized labor; the new imperialism and the origins of popular conservatism; and the women's movement. One course. *Thorne*

114B. Immigration, Migration, and Mobility of Labor: United States and the World. (CZ) The major themes of migration, its impact on the country of departure as well as of destination, factors shaping the paths of migration, the relative openness and receptivity of countries to immigrants. Within a global framework, focus on migration and immigration to the United States, from the Irish in the 1840s to Hispanic migrants of recent decades. Case studies of migration to Latin America, migration from southern to northern Europe, and migratory movements within Asia, revealing similarities and differences in migration patterns that take place in diverse cultures and at different historical epochs. One course. *Keyssar*

115. History of Africa. (CZ) Social, political, and economic development in sub-Saharan Africa from 1400 to the present. C-L: African and Afro-American Studies 115, Comparative Area Studies, and Women's Studies. One course. *Ewald*

116. Aspects of Medieval Culture. (CZ) See C-L: Medieval and Renaissance Studies 114; also C-L: Art 139 and Classical Studies 139. One course. *Rasmussen, Tronzo, and Witt*

117. Early Modern Europe. (CZ) The economic, social, and political history of early modern Europe. C-L: Comparative Area Studies, Medieval and Renaissance Studies, and Women's Studies. One course. *Neuschel*

118A. American National Security Policy from 1945 to 1975. (CZ) Evolution of American defense policy, nuclear and conventional, within the political context of the Cold War. Not open to students who have taken the former History 157, American National Security Policy from 1945 to 1975. One course. *Biddle*

118B. Warfare in the Twentieth Century. (CZ) Key conflicts of this century evaluated in terms of causes and consequences (political, social, and economic), and strategy and technology (war plans, weapons systems, and doctrine). One course. *Biddle*

119A, 119B. Native American History. (CZ) A survey of conditions and events from precolonial times to the present. One course each. *Wood*

120. History of Socialism and Communism. (CZ) The origins and development of socialist and communist movements from pre-Marxian times to the present. C-L: Comparative Area Studies. One course. *Lerner*

121A. America in International Affairs, 1607-1861. (CZ) The diplomacy of the colonial, revolutionary, and early national periods. One course. *Davis*

121B. The United States as a World Power: 1861-1941. (CZ) American diplomacy from the beginning of the Civil War to entry into World War II. One course. *Davis*

121C. American Diplomacy since 1941. (CZ) Not open to students who have taken the former History 122, American Diplomacy. One course. *Davis*

122B. Japan: Population, Resources, and Development, 1600-1940. (CZ) Population pressures and environmental degradation in Japan. The long history of dense population in the Japanese archipelago, having limited agricultural lands and mineral resources. Japan's transformation, beginning in the nineteenth century, into an industrial and imperial power. The ways historians have approached this subject, focusing on debates about population control, resource management, and the social and ecological costs of Japanese modernization. One course. *Wigen*

123S. Madness and Society in Historical Perspective. (SS) Mental illness and psychiatric treatment from antiquity to the present with special concentration on the nineteenth and twentieth centuries in Europe, America, and Russia. C-L: Comparative Area Studies. One course. *M. Miller*

124S. Slave Society in Colonial Anglo-America: The West Indies, South Carolina, and Virginia. (CZ) The development of slave-based societies and the production of staple crops for export. C-L: African and Afro-American Studies 124S and Comparative Area Studies. One course. *Gaspar*

126S. Women in the Ancient World. (CZ) See C-L: Classical Studies 104S; also C-L: Women's Studies. One course. *Boatwright*

127. The Caribbean in the Eighteenth Century. (CZ) The development of Caribbean society and economy in the contexts of slavery, empire, international rivalry, and democratic revolution. C-L: African and Afro-American Studies 127. One course. *Gaspar*

128. Comparative Social Movements. (CZ) The creation or attempted creation of democratic forms in capitalist and socialist societies, using the examples of the American Populist movement and the Polish Solidarity movement as case studies. Comparison with other social movements. C-L: Comparative Area Studies. One course. *Goodwyn*

129A. Experiment in Republicanism: The United States, 1787-1860. (CZ) Not open to students who have taken the former History 129. One course. *Nathans*

129B. From Victorian to Corporate America, 1820-1900. (CZ) Not open to students who have taken History 130. One course. *Nathans*

131A. History of Mexico and the Caribbean in the Nineteenth and Twentieth Centuries. (CZ) Not open to students who have taken History 131. C-L: Comparative Area Studies. One course. *TePaske*

131B. The Spanish Caribbean. (CZ) Cuba, the Dominican Republic, and Puerto Rico from the encounter in 1492 to the present with special emphasis on the early days of colonization, intercolonial rivalry, comparative economic and social developments, and the Cuban revolution. C-L: Comparative Area Studies. One course. *TePaske*

132. Modern World Environmental History, 1500 to the Present. (CZ) Environmental effect of global economic growth. Impacts of agriculture, forestry, mining, and

industry on the biosphere. Use of freshwater resources. Effects of modern transportation and urbanization. The world environmental movement. C-L: Comparative Area Studies. One course. *Richards*

133. Medieval Europe, 300-1400. (CZ) C-L: Medieval and Renaissance Studies. One course. *Staff*

134. Medieval England. (CZ) From the fifth through the fourteenth centuries. C-L: Medieval and Renaissance Studies. One course. *Staff*

135A. Germany from the Thirty Years' War to Unification in 1871. (CZ) The development of nationalism among a people living in over 300 states; social change in an economically backward setting; and revolution in a Romantic context. C-L: Comparative Area Studies. One course. *Koonz*

135B. Germany from 1871 to 1933. (CZ) Militarism, socialism, and feminism following the first unification; Weimar democracy in the aftermath of defeat; the popularity of Hitler in the context of the Depression. C-L: Comparative Area Studies. One course. *Koonz*

135C. Germany from 1933 to 1990. (CZ) The creation of the Nazi state, its propaganda, economic recovery schemes, and bio-political social organization. The war years, from the standpoint of the victims and perpetrators, to be examined through memoirs and psychological studies of the "holocaust kingdom." The postwar period: women's role in rebuilding Germany, de-Nazification and the Cold War in the East and West, and (based on journalists' accounts) "post-wall" Germany. The shape of public memory in "Bitburg history" and monuments to the victims of Nazi extermination. One course. *Koonz*

136. Introduction to Contemporary Latin American Reality. (CZ) The complexity and diversity of factors which help to define the daily experience of Latin American reality for contemporary Latin Americans. Through cultural, academic, and government documents, issues ranging from ecology and energy policy in Brazil to human rights abuses and the experience of women in modern Latin America will be studied. One course. *James*

137. Strategies of Comparative Analysis. (SS) See C-L: Comparative Area Studies 125; also C-L: Cultural Anthropology 125, Political Science 125, Religion 121, and Sociology 125. One course. *Staff*

138. Renaissance and Reformation Germany. (CZ) The interplay of social, economic, and political developments in Central Europe from the eve of the Reformation to the end of the Thirty Years' War, with particular attention to the links between religion, gender, and the social order. C-L: Comparative Area Studies and Medieval and Renaissance Studies. One course. *Robisheaux*

140S. Economics of Slavery in the American South. (SS) Prerequisite: Economics 149. See C-L: Economics 161S; also C-L: African and Afro-American Studies 161S. One course. *Coats*

141S. American Light. (CZ) The stories, poems, and essays of Raymond Carver and the paintings of Edward Hopper as a means of thinking about the social history of America's twentieth-century working-class people. One course. *Coles*

142A. China: Roots of Revolution. (CZ) A survey of modern Chinese history with special emphasis on the nineteenth and twentieth centuries. Not open to students who have taken History 142. C-L: Comparative Area Studies. One course. *Dirlik or Mazumdar*

142B. China since 1949: The People's Republic. (CZ) The Chinese path to communism and the communist transformation of Chinese society. Not open to students who have taken History 139. C-L: Comparative Area Studies. One course. *Dirlik or Mazumdar*

143A. Ancient and Early Modern Japan. (CZ) Japan from earliest settlement to 1868; the Heian Court, rise of the samurai, feudal society and culture, the Tokugawa age, and the Meiji Restoration. Not open to students who have taken the former History 143. C-L: Comparative Area Studies. One course. *Gordon or Wigen*

143B. The Emergence of Modern Japan. (CZ) Japan from Meiji to microchips. The Meiji settlement, industrialization and urban growth; political parties, social movements, and foreign policy in the imperial era; World War II and the American occupation; economic recovery. Not open to students who have taken the former History 144. C-L: Comparative Area Studies. One course. *Gordon or Wigen*

145A, 145B. Afro-American History. (CZ) The black experience in America from slavery to the present. C-L: African and Afro-American Studies 145A, 145B and Comparative Area Studies. One course each. *Gavins*

146. Introduction to Russian Civilization. (CZ) See C-L: Russian 190; also C-L: Comparative Area Studies. One course. *Pelech*

148. Aspects of Renaissance Culture. (CZ) See C-L: Medieval and Renaissance Studies 115; also C-L: Art 149. One course. *Rasmussen, Van Miegroet, and Witt*

149. Military History. (CZ) War, politics, and technology. One course. *Roland*

151A. The Intellectual Life of Europe, 1250-1600. (CZ) Not open to students who have taken History 104. C-L: Comparative Area Studies and Medieval and Renaissance Studies. One course. *Witt*

151C. European Intellectual History, 1789-1848. (CZ) Contextual study of some major works in European social and political thought from the late Enlightenment and the French Revolution to the revolutions of 1848. Readings in Kant, Wollstonecraft, Burke, de Staël, Constant, Hegel, Marx, and Tocqueville, as well as in secondary interpretations and historical works. One course. *Hacohen*

151E. European Intellectual History, 1848-1918. (CZ) Contextual study of some major works in European social and political thought from the revolution of 1848 to the First World War. Readings in Mill, Taylor, Marx, Nietzsche, Freud, Durkheim, Weber, Lenin, Kollantai, and Gramsci, as well as in secondary interpretations and historical works. One course. *Hacohen*

152. The Modern Middle East. (CZ) The historical development of the Middle East in the nineteenth and twentieth centuries. The emergence of nation-states in the region following World War I. C-L: Comparative Area Studies. One course. *Y. Miller*

153. The Insurgent South. (CZ) One course. *Goodwyn*

154A. Society and the State in France, 1700 to the Present. (CZ) Examines French social history in relation to the growth of the state from the old regime to the present day. Attention given to those turning points such as the revolutions of 1789 and 1848 or the cataclysm of World War I, in which society imposed a new shape on the state and, in turn, was transformed by it. Gender, the family, economic development, leisure, and literature. One course. *Reddy*

154D. The French Revolution at 200 Years. (CZ) The uncertainties that still surround historical interpretations of this seminal event. One course. *Reddy and Stewart*

155. Mexico From Pre-Columbian Times to the Present. (CZ) The rise of Native American civilizations, Spanish Conquest and colonization, Wars of Independence, and nineteenth-century political instability. Special attention to the Mexican Revolution and its impact on modern Mexico. One course. *Tepaske*

156A. The Reformation of the Sixteenth Century. (CZ) See C-L: Religion 167. One course. *Hillerbrand*

156B. History of the Christian Church. (CZ) See C-L: Religion 120. One course. *Hillerbrand*

157A, 157B, 157C. The Rise of Modern Science. (CZ) The development of science and medicine, with attention to cultural and social influences upon science. 157A: through Newton. 157B: eighteenth to twentieth centuries. 157C: twentieth century. History 157C not open to students who have taken the former History 118, Science in the Twentieth Century. One course each. *Green and Mauskopf*

158A. New Perspectives on the Atlantic World. (CZ) Reorients the histories of four continents. An exploration of how an Atlantic world arose because of the interactions among Africa, North America, South America, and Europe. How this Atlantic world originated in the fifteenth century; how people emigrated, by force or free will, from one continent to another (and often back again); how plants, animals, trade goods, and diseases crossed the ocean; how ideas—especially revolutionary ideas—arose from intercontinental contact and spread throughout the Atlantic world. Concludes that people of each of the Atlantic continents possess a heritage including the three other continents, and that this heritage was ocean-borne. One course. *Ewald*

159S. The Palestine Problem and United States Public Policy. (CZ) See C-L: Public Policy Studies 175S; also C-L: Comparative Area Studies. One course. *Kuniholm*

160. The United States from the New Deal to the Present. (CZ) C-L: Women's Studies. One course. *Chafe*

161. History of Modern Russia. (CZ) Following a brief introduction to the medieval origins of the Imperial Russian state, the course will concentrate on the period between the reign of Catherine the Great (1762-1796) and the death of Lenin in 1924. Emphasis on state authority, ruling elites, and the formation of the opposition revolutionary movement leading to the Bolshevik seizure of power in 1917. Not open to students who have taken both History 161A and 161B. C-L: Comparative Area Studies. One course. *M. Miller*

162A. Diplomatic Relations in the Western Hemisphere. (CZ) Relations between Latin America and the United States from 1815 through the 1960s with special emphasis on Mexico, Central America, and the Caribbean. The eras of Manifest Destiny, Dollar Diplomacy, the Cold War, and the Cuban Revolution as seen through the biography and discourse of participants and historians. One course. *French*

163A. The Coming of the United States' Civil War, 1820-1860. (CZ) Slavery and the gradual collapse of the early national consensus concerning it. The rise of sectionalism as reflected mainly in the nation's politics. One course. *Durden*

163B. The United States' Civil War and its Aftermath, 1861-1900. (CZ) Emphasis on the political and social aspects of the war; only slight treatment of battles. Political, racial, and economic themes of the Reconstruction and Populist eras. One course. *Durden*

164. India, Pakistan, and Bangladesh: 1750 to the Present. (CZ) Social and economic impact of Western rule, development of nationalism and independence. C-L: Comparative Area Studies. One course. *Richards*

165. Working Class History in the United States. (CZ) A social history of the working class, as well as a political history of labor, from the early nineteenth century to the present. Not open to students who have taken History 106. One course. *Keyssar*

166S. American Dreams, American Realities. (CZ) The role of such myths as "rags to riches," "beacon to the world," the "frontier," and the "foreign devil" in defining the American character and determining the hopes, fears, dreams, and actions of people throughout American history. One course. *Wilson*

167S. United States and Canadian Constitutional Issues. (CZ) A comparative study of the development of federalism. C-L: Canadian Studies and Comparative Area Studies. One course. *Cahow*

168S. The Atlantic Slave Trade. (CZ) The development of the slave trade from the fifteenth century to its abolition in the nineteenth century; organization and mechanics, impact on Europe, Africa, and the Americas. C-L: African and Afro-American Studies 168S and Comparative Area Studies. One course. *Gaspar*

169A, 169B. The Social History of American Women. (CZ) C-L: Women's Studies. One course each. *Hewitt*

170C. Brazilian Race Relations in Comparative Perspective. (CZ) Slavery and the post-emancipation trajectory of Afro-Brazilians in a racist society which officially proclaims itself a "racial democracy." Comparisons will be drawn with the Afro-American experience elsewhere in Latin America and the United States. C-L: African and Afro-American Studies 170. One course. *French*

171A. History of Women in Early Modern Europe. (CZ) Women in Europe from medieval times to 1800 with attention to economic, social, and intellectual experience. C-L: Comparative Area Studies and Women's Studies. One course. *Neuschel*

171B. History of Women in Modern Europe. (CZ) History of women in Europe since 1700 with attention to economic, social, and intellectual experience. C-L: Comparative Area Studies and Women's Studies. One course. *Koonz*

173. History of Spain from Late Medieval Times to the Present. (CZ) Development of the Spanish nation-state from the times of Ferdinand and Isabella, Charles V, and Philip II to the Franco regime and its aftermath. C-L: Comparative Area Studies and Medieval and Renaissance Studies. One course. *TePaske*

174A. History of Colonial Hispanic America from Pre-Columbian Times to the Wars of Independence. (CZ) The pre-Columbian cultures, European conquest and its effects on the Amerindian peoples, and development of the Spanish and Portuguese Empires to the wars of independence with special emphasis upon colonial institutions and socioeconomic developments. Not open to students who have taken History 174. C-L: Comparative Area Studies and Medieval and Renaissance Studies. One course. *TePaske*

174B. Modern Latin America. (CZ) A survey of nineteenth- and twentieth-century economic, social, and cultural change. Not open to students who have taken History 177. C-L: Comparative Area Studies. One course. *Staff*

175S. The Southern Plantation as Historical Laboratory: Odyssey in Black and White, 1770-1970. (CZ) Readings and discussion on the plantation as a microcosm of Southern social history since 1770, emphasizing the parallel evolution of black and white communities, families, economies, cultures, perceptions, and power struggles. C-L: African and Afro-American Studies 175S. One course. *Nathans*

176S. The Southern Plantation as Historical Laboratory: Research Seminar. (CZ) Original research projects and seminar discussions on the social history of the plantation and its black and white inhabitants, relying on manuscripts at Duke and at the Southern Historical Collection, statistical records, the architectural legacy, literary and oral testimony, material culture, and folklore. C-L: African and Afro-American Studies 176S. One course. *Nathans*

179. History of South Africa, 1600-1960. (CZ) The relationships among South Africa's racial and cultural communities, with special attention to economic and political developments within each community and the impact of those developments on their mutual interactions. C-L: African and Afro-American Studies 179 and Comparative Area Studies. One course. *Ewald*

180. The Soviet Experience. (CZ) A survey of the history of Russia and the Soviet Union from the eve of the Revolution to the present day with particular emphasis on political, social, and cultural change and continuity. Not open to students who have had History 262. C-L: Comparative Area Studies. One course. *Lerner*

183S. Canada from the French Settlement. (CZ) Problems in the development of Canada and its provinces. C-L: Canadian Studies and Comparative Area Studies. One course. *Cahow or Thompson*

184S. Canadian Issues. (SS) Prerequisite: Interdisciplinary Course 98 or consent of instructor. See C-L: Interdisciplinary Course 184S; also C-L: Canadian Studies, Comparative Area Studies, Cultural Anthropology 184S, Economics 184S, Political Science 184S, and Sociology 184S. One course. *Staff*

186. Marxism and Society. (SS) See C-L: Cultural Anthropology 139; also C-L: Comparative Area Studies, Education 139, Interdisciplinary Course 139, Literature 139, and Sociology 139. One course. *Staff*

187. History and Religions of North Africa. (CZ) See C-L: Religion 164; also C-L: African and Afro-American Studies 164, Comparative Area Studies, and Interdisciplinary Course 164. One course. *Cornell or Lawrence*

188A. Genocide in the Twentieth Century. (CZ) Focus on four cases in which soldiers have launched murderous attacks against civilians: Turks against Armenians, Nazis against Jews and other racial enemies, Khmer Rouge against their Cambodian enemies, and "ethnic cleansing" in Yugoslavia. Examines responsibility of both perpetrators and bystanders. One course. *Koonz*

189A. Medicine in the West. (CZ) Concepts of disease, the social context of the delivery of medical care, and the standing of physicians in society. The relation between medical theory and medical practice. Not open to students who have taken History 189. One course. *Green*

189B. History of Public Health in America. (CZ) The role of epidemic diseases such as smallpox, cholera, yellow fever, tuberculosis, and polio in shaping public health policy in the United States from the colonial era to World War II. One course. *Humphreys*

190. The History of Women in Science and Medicine. (CZ) The history of scientific and medical theories about women and an analysis of women as participants in the evolution of science and medicine. One course. *Green*

193, 194. Introduction to the Civilizations of Southern Asia. (CZ) See C-L: Interdisciplinary Course 101, 102; also C-L: Asian and African Languages and Literature 160, 161; Comparative Area Studies; Cultural Anthropology 101, 102; and Religion 160, 161. One course each. *Khanna or staff*

SMALL GROUP LEARNING EXPERIENCES

Independent Study

Independent study is usually undertaken by students concurrently with a course or with an instructor with whom they have had a course. Students should submit to the instructor in writing a detailed description of intent in the study. Both the instructor's consent and approval of the director of undergraduate studies are required for enrollment.

191, 192. Independent Study. One course each. *Staff*

Undergraduate Seminars

See also History 21S, 22S, 49S, 91S, 92S, 93S, 105S, 106S, 123S, 124S, 140S, 141S, 159S, 166S, 167S, 168S, 175S, 176S, 183S, 184S.

195S, 196S. Seminars for Undergraduates. Opportunities for historical investigation of significant problems. Juniors as well as seniors may apply for admission to these courses and are urged to do so if they expect to be candidates for graduation with distinction in history or if they expect to practice-teach in their senior year. Open to majors and nonmajors. The sections are listed below. One course each. *Staff*

Courses with an asterisk are offered for year-long study and carry two course credits. For these courses students may obtain the instructor's permission to enroll in only one semester and receive credit. Courses without an asterisk are one semester courses and carry one course credit each.

2. Reform, Protest, and Social Change in the Nineteenth-Century United States. (CZ) *Nathans*
- *3. Problems in the Social and Intellectual History of the United States. (CZ) *Staff*
- *4. Medicine and Society in America. (CZ) *English*
5. Japanese Women's History. (CZ). C-L: Women's Studies. *Wigen*
- *6. The Era of the American Civil War, 1820-1900. (CZ) *Durden*
7. Religion and Society in Modern British History. (CZ) *Thorne*
- *8. Modern Chinese Thought. (CZ) C-L: Comparative Area Studies. *Dirlík*
9. Issues in Early Modern Japanese Development. *Wigen*
10. History of Jews in Eastern Europe in Modern Times. *Lerner*
13. Problems in Early Modern English History. (CZ) C-L: Comparative Area Studies and Medieval and Renaissance Studies. *Herrup*
14. Social Movements in the American South, 1865-1970. (CZ) *Goodwyn*
15. Society and Polity in France, 1700 to the Present. (SS) C-L: Comparative Area Studies. *Reddy*
16. Science and Society. (CZ) *Mauskopf*
- *17. Problems in the History of Modern Japan. (CZ) C-L: Comparative Area Studies. *Gordon*
18. The Destruction and Aftermath of Slavery in the Americas: A Comparative Perspective. (CZ) C-L: African and Afro-American Studies 197S and Comparative Area Studies. *J. Scott*
19. Social Conflict and Political Change in the United States, 1789-1860. (SS) *Nathans*
20. The Asian-American Experience. (SS) *Dirlík*
21. Problems in Indian History. C-L: Comparative Area Studies. (SS) *Richards*
- *22. Problems in Latin American History. (SS) C-L: Comparative Area Studies. *TePaske*
23. Issues in the History of Tropical Africa. (SS) C-L: African and Afro-American Studies 196S and Comparative Area Studies. *Ewald*
- *24. Problems in Recent United States Diplomatic History. (CZ) *Davis*
25. Problems in Twentieth-Century American History. (SS) *Chafe*
26. State and Society in the Third Reich. (CZ) *Koonz*
27. Origins of the Cold War. (SS) *Kuniholm*
28. The Spanish Civil War and Its Aftermath. (CZ) *TePaske*
29. Proletarians and Peasants, Bandits and Prophets: Social Movements in Nineteenth- and Twentieth-Century Latin America. (CZ) *James*
30. Problems in Russian History. (CZ) C-L: Comparative Area Studies. *M. Müller*
31. History and Memory of Nazi Genocide. (CZ) *Koonz*
32. Crime and Society: Changing Definitions of Criminality in England and America. (SS) *Herrup*
33. Political Participation in the United States. (SS) *Keyssar*
34. Problems in Imperialism. (CZ) *Cell*
35. Palestine and the Arab-Israeli Conflict. (CZ) C-L: Comparative Area Studies. *Y. Müller*
36. Women, Family, and State. (CZ) C-L: Comparative Area Studies and Women's Studies. *Y. Müller*

37. *Before Columbus: Western Views of the Non-Western World.* (CZ) *Green*
38. *The Costs of Industrialization.* (CZ) *Goodwyn*
40. *Fugitive Slave (Maroon) Communities in New World Slave Societies.* (CZ) C-L: African and Afro-American Studies 1955 and Comparative Area Studies. *Gaspar*
41. *Women in Medieval Society.* (CZ) C-L: Women's Studies. *Green*
- *43. *The Transition from Rural to Urban Society.* (CZ) *A. Scott*
44. *Popular Patriotism in Modern British History.* (CZ) *Thorne*
45. *Canadian and American Agrarian Movements.* (SS) C-L: Canadian Studies. *Thompson*
48. *History of Witchcraft and Magic: Antiquity to 1700; 1700 to Present.* (CZ) *Robisheaux*
50. *The Women's Movement in the United States.* (CZ) C-L: Women's Studies. *Hewitt*
54. *Community Service and Documentary Tradition.* (CZ) C-L: Public Policy Studies 1955.27. *Coles and Harris*
57. *Middle East Conflict and United States Policy.* (CZ) *Kuniholm*
59. *History of Zionism and the State of Israel.* (CZ) *Y. Miller*
64. *Immigrants, Caudillos, and Populists in Modern Argentina.* (CZ) *French or James*
65. *Women in Latin America.* (CZ) *French*
66. *Sex, Race, and Class in America.* (CZ) *Hewitt*
74. *Land of the South: An Ecological Approach.* (CZ) *Rosengarten*
75. *The Computer Revolution.* (CZ) *Roland*

Honors Seminars

197S-198S. Senior Honors Seminar. Designed to introduce qualified students to advanced methods of historical research and writing and to the appraisal of critical historical issues. Open only to seniors, but not restricted to candidates for graduation with distinction. This course, when taken by a history major, is accompanied by either a year-long 195S-196S seminar or two courses at the 200 level. In unusual circumstances, with consent of the instructor, coordinator of the senior honors seminar, and director of undergraduate studies, 191-192 may replace the two courses of 195S-196S seminars or the two courses at the 200 level. Two courses. *Staff*

ADVANCED COURSES (FOR SENIORS AND GRADUATES)

Students may receive credit for either semester of a hyphenated course at the 200 level without taking the other semester if they obtain written consent from the instructor.

201S. The Russian Intelligentsia and the Origins of the Revolution. (CZ) Origin and dynamics of the Russian revolutionary movement, the intelligentsia, and the emergence of the labor movement. C-L: Comparative Area Studies. One course. *M. Miller*

202S. The Russian Revolution. (CZ) An analysis of the Bolshevik seizure of power in 1917 and the establishment of a revolutionary society and state during the 1920s. C-L: Comparative Area Studies. One course. *M. Miller*

203. Topics in Modern World Environmental History. (CZ) Human effects upon the natural environment; case studies and a synthetic global perspective. One course. *Richards*

206. Origins of Afro-America. (CZ) A comparative and interdisciplinary approach to early history of Africans in the Western hemisphere. Uses anthropological, linguistic, and archeological literature in addition to historical studies to examine the origins of the diverse African-American cultures of the Americas. C-L: African and Afro-American Studies 206. One course. *J. Scott*

207S. Geographic Perspectives in History I: Western Europe and the Americas. (SS) Connections between history and geography. Regional, spatial, and environmental analyses of social development in Western Europe and the Americas. One course. *Wigen*

208S. Geographic Perspectives in History II: Asian and Pacific Worlds. (SS) Connections between history and geography. Regional, spatial, and environmental analyses of social development in Asia and the Pacific region. C-L: Comparative Area Studies. One course. *Wigen*

209S. Race, Class, and Gender in Modern British History. (CZ) The intersection between gender, race, and class identities in British history since the eighteenth century. The parallels and overlaps as well as the disjunctures and distinctions between these different modes of power in a period of tremendous economic, social, and political change resulting from industrialization and imperial expansion. Questions and issues include the impact of industrialization on gender as well as class consciousness, the role of women, the middle classes and the working classes in the campaign against slavery, British workers' reactions to the "scramble" for colonies, the attitudes and activities of British women in the empire, and sexuality and the evolution of racist discourse. One course. *Thorne*

210S. Anthropology and History. (SS) Prerequisite: major in history, one of the social sciences, or comparative area studies; or graduate standing. See C-L: Cultural Anthropology 207S. One course. *Reddy*

211A. History of Medicine in the Southern United States. (CZ) The social history of disease and medical practice in the southern United States from the colonial era to World War II. Topics will include the impact of disease on the region's settlement and economy, slave health, the role of "alternate practitioners," and the growing federal presence in the post-Reconstruction South. One course. *Humphreys*

213S. Early Modern France. (CZ) Intensive survey of French history from approximately 1500-1750, including political, social, religious, and economic history. Focuses on interpretive trends in historiography and links between cultural history and literature. One course. *Neuschel*

214. Class, Public Opinion, and the French Revolution. (CZ) The current state of the ongoing controversies over the origins and character of the first modern social revolution. One course. *Reddy*

216S. United States Diplomacy, 1890-1945. (CZ) C-L: Canadian Studies. One course. *Davis*

217. Problems in American Colonial History. (CZ) One course. *J. Scott*

218S. Perspectives on the Atlantic World. (CZ) One course. *Ewald*

219S, 220S. History of Science and Technology. (CZ) The interaction of science and technology in the Western world from earliest times to the present. One course each. *Mauskopf and Roland*

221. Topics in the Social and Economic History of Europe, 1200-1700. (CZ) C-L: Comparative Area Studies and Medieval and Renaissance Studies. One course. *Staff*

222. Problems in the Intellectual History of the European Renaissance and Reformation. (CZ) Prerequisites: History 151A, 151B and reading knowledge of German, French, or Italian. C-L: Medieval and Renaissance Studies. One course. *Witt*

223S, 224S. The World Wars. (CZ) The causes, course, and consequences of World Wars I and II, from military, political, and economic perspectives; the legacy of World War II; special emphasis on understanding the experience of total war—not only for the individual soldier but for whole societies. One course each. *Biddle*

225S. Problems in Comparative Labor History. (SS) Common dilemmas and varying solutions in the cross-national development of labor-management relations, their political implications, and their larger historical significance. One course. *French, Gordon, or Keyssar*

226. Topics in the Labor History of the United States. (SS) One course. *Keyssar*

230S. Populism in Latin America. (CZ) An examination of the various theoretical frameworks developed for Latin American populism, followed by case studies focusing on issues such as the emergence of a modernizing state, the role of the masses in populist movements, and the class content and ideological and cultural parameters of such movements. One course. *James*

231S. Readings in Latin American Colonial History. (CZ) C-L: Comparative Area Studies. One course. *TePaske*

233S. Slave Resistance and Social Control in New World Societies. (CZ) The operation of slave societies in the Americas from the sixteenth to the nineteenth centuries focusing on master-slave relations and slave resistance. C-L: African and Afro-American Studies 233S and Comparative Area Studies. One course. *Gaspar*

234S. Political Economy of Development: Theories of Change in the Third World. (SS) See C-L: Political Science 234S; also C-L: Comparative Area Studies, Cultural Anthropology 234S, Interdisciplinary Course 234S, and Sociology 234S. One course. *Staff*

235S. The Antebellum South. (CZ) The economic, political, and social aspects of life in the South, 1820-1860. One course. *S. Nathans*

237S. Europe in the Early Middle Ages. (CZ) C-L: Medieval and Renaissance Studies. One course. *Staff*

238S. Europe in the High Middle Ages. (CZ) C-L: Medieval and Renaissance Studies. One course. *Staff*

239S. History of Socialism and Communism. (CZ) Problems in the origins and development of socialist and communist movements. C-L: Comparative Area Studies. One course. *Lerner*

241S-242S. United States' Constitutional History. (CZ) 241S: to 1865; 242S: 1865 to present. Two courses. *Cahow*

243-244. Marxism and History. (SS) Critical examination of Marxist theory and its relevance to historical understanding and explanation. C-L: Comparative Area Studies. Two courses. *Dirlik*

245, 246. Social and Intellectual History of China. (CZ) C-L: Comparative Area Studies. One course each. *Dirlik*

248. History of Modern India and Pakistan, 1857 to the Present. (CZ) C-L: Comparative Area Studies. One course. *Richards*

251A. Topics in Intellectual History of Europe, 1250-1450. (CZ) C-L: Medieval and Renaissance Studies. One course. *Witt*

251B. Topics in Intellectual History of Europe, 1450-1650. (CZ) C-L: Comparative Area Studies and Medieval and Renaissance Studies. One course. *Witt*

252. Construction of China in European and American Literature. (CZ) An examination, starting with Marco Polo's account of China, of representations of China in Euro-American writing toward an understanding of a Euro-American discourse on China. Emphasis on fiction, but consideration as well of the relationship between fictional and nonfictional writing (especially history, geography, and travelogue). While the approach is historical, contemporary representations of China are of primary concern. One course. *Dirlik*

253S, 254S. European Diplomatic History, 1871-1945. (CZ) Origins of the First and Second World Wars, the diplomacy of the wars, and the peace settlements which

followed them. 253S: 1871-1918; 254S: 1919-1945. C-L: Comparative Area Studies. One course each. *W. Scott*

256. **Modern Literature and History.** (AL) See C-L: French 256. One course. *Orr*

257. **Comparative Latin America Labor.** (CZ) An interdisciplinary examination of the monographic literature on Latin-American labor in the twentieth century. One course. *French*

258S. **Social Conflict in Weimar and Nazi Germany.** (CZ) The interactions between emancipation and backlash; military defeat and patriotism; political equality and biopolitics; dissent and repression; and among propaganda, bureaucratic chaos, and police terror. C-L: Comparative Area Studies. One course. *Koonz*

259. **Archaic Greece.** (CZ) See C-L: Classical Studies 221. One course. *Oates or Rigsby*

260. **Fifth and Fourth Century Greece.** (CZ) See C-L: Classical Studies 222. One course. *Oates or Rigsby*

262. **Problems in Soviet History.** (CZ) Studies in the background of the Revolution of 1917 and the history and politics of the Soviet state. C-L: Comparative Area Studies. One course. *Lerner*

263. **The Roman Republic.** (CZ) See C-L: Classical Studies 224. One course. *Boatwright or Rigsby*

265S. **Problems in Modern Latin American History.** (SS) C-L: Comparative Area Studies. One course. *Staff*

267S. **England in the Sixteenth Century.** (CZ) C-L: Comparative Area Studies and Medieval and Renaissance Studies. One course. *Herrup*

268S. **England in the Seventeenth Century.** (CZ) C-L: Comparative Area Studies and Medieval and Renaissance Studies. One course. *Herrup*

271S. **The Law of War.** (CZ) The evolution of constraints on warfare in the Western world, both codified and customary. The concept of the "just war" as well as restrictions on the conduct of combat (ground, naval, and aerial) as they have evolved over time. One course. *Biddle*

272S. **Fin-de-siècle and Interwar Vienna: Politics, Society, and Culture.** (CZ) Advanced undergraduate seminar in intellectual history focusing on the cultural milieu of *fin-de-siècle* and interwar Vienna. One course. *Hacohen*

273S, 274S. **Topics in the History of Science.** (CZ) Critical stages in the evolution of scientific thought. One course each. *Mauskopf*

275S. **Asian and Asian-American Women in Comparative Perspective.** (CZ) A woman-centered approach to the history of colonialism and nationalist struggles in Asia, the evolution of racialist discourse and its impact on Asian immigration to the United States. One course. *Mazumdar*

277S. **The Coming of the Civil War in the United States, 1820-1861.** (CZ) One course. *Durden*

278S. **The Civil War in the United States and Its Aftermath, 1861-1900.** (CZ) One course. *Durden*

279, 280. Health, Healing, and History. (CZ) The development of medicine within the broader cultural context from prehistory to the twentieth century. One course each. *English*

281S. United States' Diplomacy since 1945. (CZ) C-L: Canadian Studies. One course. *Davis*

282S. Canada. (SS) A research seminar for advanced students familiar with Canada. Topics vary each semester; recent perspectives have included nationalism, Canadian-American relations, regionalism in the Maritimes and the West, and cross-border environmental issues, among others. C-L: Canadian Studies, Comparative Area Studies, Cultural Anthropology 282S, Economics 282S, Interdisciplinary Course 282S, Political Science 282S, and Sociology 282S. One course. *Staff*

285S, 286S. Oral History. (SS) Research on race relations and civil rights in the United States in the twentieth century using techniques of oral history. Consent of instructor required. One course each. *Chafe and Goodwyn*

287S. History and Social Theory. (CZ) Contemporary theories of social order, social change, and revolution. One course. *Goodwyn*

Upperclassmen-Graduate Seminars

See History 201S, 202S, 207S, 208S, 210S, 215S, 216S, 219S, 220S, 225S, 230S, 233S, 235S, 237S, 238S, 239S, 241S, 242S, 253S, 254S, 258S, 265S, 267S, 268S, 269S-270S, 273S, 274S, 277S, 278S, 281S, 282S, 285S, 286S, 287S.

COURSES CURRENTLY UNSCHEDULED

94. The Age of Augustus. (CZ)

100M-100N. Roman and Non-Roman in Ancient Italy. (CZ)

181. Alexander the Great. (CZ)

182C. History of Greek and Roman Civil Law. (CZ)

185. American Diplomacy from the Kennedy Administration to the Present. (SS)

204. German Society, 1914-1945. (CZ)

205S. Gender and War. (CZ)

212. The American Indian in the Revolutionary Era, 1760-1800. (CZ)

215S. The United States in International Relations: The Eighteenth and Nineteenth Centuries. (CZ)

227-228. Recent United States History: Major Political and Social Movements. (CZ)

247. History of Modern India and Pakistan, 1707-1857. (CZ)

249-250. Social and Intellectual History of the United States. (CZ)

261. Alexander and the Hellenistic World. (CZ)

264. The Roman Empire. (CZ)

266. Late Antiquity. (CZ)

269S-270S. British History, Seventeenth Century to the Present. (CZ)

HISTORY COURSES BY FIELDS

History courses for undergraduates are offered in five fields, as noted below; students majoring in the department must complete at least one course in each of three fields. A course listed in two fields may be used to meet the requirement in either of those fields, but may not be used for both.

Africa, Asia, Canada, Caribbean, Latin America, Russia. History 75, 76, 98, 101C, 100E, 100L, 100J, 101G, 101K, 101M, 102G, 104B, 108C, 109, 110, 112A, 112B, 114B, 115, 120, 123S, 124S, 127, 128, 131A, 131B, 132, 136, 142A, 142B, 143A, 143B, 146, 152, 155, 158A, 159S, 161, 162A, 164, 167S, 168S, 170C, 174A, 174B, 179, 180, 183S, 184S, 186, 187, 193, 194; 195S, 196S sections 5, 8, 9, 17, 18, 20, 21, 22, 23, 29, 30, 34, 35, 36, 40, 43, 45, 57, 59; 201S, 202S, 206, 208S, 218S, 225S, 230S, 231S, 233S, 239S, 243, 244, 245, 246, 247, 248, 262, 265S, 282S.

Ancient, Medieval and Renaissance. History 21, 21D, 21S, 51, 53, 54, 94, 100B, 100K, 107A, 116, 117, 125, 126, 133, 134, 138, 148, 151A, 156A, 173, 178, 181, 182C; 195S, 196S sections 13, 36, 39, 41, 48; 221, 222, 237S, 238S, 251A, 251B, 260, 261, 263, 264, 266, 267S, 268S.

Medicine, Military, Science, Technology. History 101H, 118A, 118B, 123S, 132, 149, 154A, 157A, 157B, 157C, 163A, 163B, 189A, 190; 195S, 196S sections 4, 16, 75; 203S, 205S, 208S, 210S, 211A, 213S, 219S, 220S, 223S, 224S, 225S, 273, 274, 279, 280.

Modern Europe. History 21, 21D, 21S, 22, 22D, 22S, 100A, 100C, 100F, 100G, 100H, 101C, 101H, 101N, 107A, 107B, 109, 110, 112A, 112B, 113, 114B, 117, 120, 123S, 128, 135B, 135C, 137, 138, 151A, 151C, 151E, 154A, 154D, 155, 156B, 158A, 171A, 171B, 173, 180, 188A; 195S, 196S sections 7, 10, 13, 15, 26, 28, 31, 32, 34, 36, 48; 204, 207S, 213S, 214, 221, 222, 225S, 239, 253S, 254S, 256, 258S, 268S, 269S, 270S.

United States. History 91, 91D, 91S, 92, 92D, 92S, 93S, 100L, 100Q, 101C, 101N, 108C, 111A, 111B, 111C, 114B, 118A, 121A, 121B, 121C, 123S, 124S, 128, 129A, 129B, 140S, 141S, 145A, 145B, 153, 155, 157A, 157B, 157C, 158A, 159S, 160, 162A, 163A, 163B, 165, 166S, 167S, 168S, 169A, 169B, 170C, 175S, 176S, 185; 195S-196S sections 2, 3, 4, 6, 14, 18, 19, 20, 24, 25, 27, 32, 33, 38, 43, 45, 57, 74; 206, 212, 215S, 216S, 217, 225S, 226, 227, 228, 235, 241S-242S, 249-250, 277S, 278S, 281S, 285S, 286S, 287S.

THE MAJOR

Introductory Courses. Two introductory courses in history (21, 22; 21D, 22D; 21S, 22S; 91D, 92D; 91S, 92S; 93S).

Major Requirements. Eight courses in history including (1) at least two introductory courses (History 94 and 98 do not fulfill this requirement), (2) at least one course in each of three out of the five fields described above, (3) two courses in an undergraduate seminar (195S, 196S) or on the 200 level. Some of the courses at this level are two-semester sequences; a few of these require the student to take both semesters in order to get a grade. Except for these few cases, students are not required to take both semesters of two-semester courses.

Advanced Placement Credit. Two of the eight courses needed for the major may be fulfilled by advanced placement credits. If two additional advanced placement credits have been granted they may be applied toward the thirty-four credits needed for graduation, but may not be applied to the history major.

Transfer Credit. At least six of the eight courses required for the history major must be taken at Duke. Exceptions to this rule may be made for students with Advanced Placement credit who also study abroad while at Duke. In such instances, two Advanced Placement credits and two credits from a study abroad program may apply toward the eight courses required for the major.

Foreign Languages. Majors interested in a particular area of study benefit from knowledge of the language of that area. Majors who contemplate graduate work are reminded of the requirement of a reading knowledge of one or two foreign languages.

Majors Planning to Teach. Majors who plan to teach in secondary schools should consult an advisor in education. Rising juniors who intend to practice-teach in the senior year should take the 195S-196S or 197S-198S seminars or 200-level courses as juniors.

Honors/Distinction. Any student who is qualified (see the section on honors in this bulletin) may apply to the director of undergraduate studies for permission to undertake work leading to a degree with distinction in history.

House Courses (HC)

See the chapter "Academic Procedures and Information" for information on house courses.

Human Development Program

Professor Thompson, *Director*

A certificate, but not a major, is available in this program.

The goal of this interdisciplinary program is to broaden and enhance the perspectives of students interested in human development. The program seeks to foster an understanding and appreciation of how biological, psychosocial, and cultural factors act together in development throughout the life course; highlight the ways in which different disciplines conceptualize and study development; demonstrate the complementarity of disciplinary perspectives; and facilitate dialogue among faculty and students, illustrating the complementarity of and necessity for multidisciplinary perspectives.

Achievement of the program's goal is facilitated by an integrated curriculum of required and elective courses, a research apprenticeship, a lecture series, and other special events. An active advisory procedure assists students in planning learning opportunities. A certificate is available for students who complete program requirements. Participation in selective parts of the program and in the advisory system, however, is available to all undergraduates whether or not they seek the certificate.

The curriculum includes six courses, completion of which is required for the program certificate:

Interdisciplinary Course 124. Human Development. C-L: Psychology 124 and Sociology 124. *N. Anderson or Gustafson*

Either Psychology 159S (Biological Psychology of Human Development, *Thompson*) or Interdisciplinary Course 180, C-L: Psychology 130 and Sociology 169 (Psychosocial Aspects of Human Development, *Martin Lakin and Maddox*)

Interdisciplinary Course 190. Research Apprenticeship in Human Development. *Thompson and staff*

Interdisciplinary Course 191S. Senior Seminar in Human Development. *Thompson and staff*

Two elective courses chosen from an illustrative list of biological, psychological, and social scientific courses affiliated with the program published in the program brochure. This list of elective courses includes Interdisciplinary Course 192S (Special Topics in Human Development).

The research apprenticeship arranged through the program and the related senior seminar would ordinarily be available only to students seeking the program certificate. Other components of the program are available to all undergraduates.

Immunology

For courses in Immunology, see Medicine (School)—Graduate (School) Basic Science Courses Open to Undergraduates.

Interdisciplinary Courses (IDC)

49S. *First-Year Seminar.* Topics vary each semester offered. One course. *Staff*

98. *Introduction to Canada.* (SS) History, economy, society, politics, and institutions of Canada. C-L: Canadian Studies, Economics 98, History 98, Political Science 98, and Sociology 98. One course. *Leclerc or Thompson*

99. Perspectives in Archaeology. (CZ) See C-L: Religion 99; also C-L: Classical Studies 99 and Judaic Studies. One course. *C. Meyers, E. Meyers, Younger, and staff*

101, 102. Introduction to the Civilizations of Southern Asia. (CZ) The literary, historic, linguistic, and ethnic diversity of South Asia presented through both readings and contemporary films. C-L: Asian and African Languages and Literature 160, 161; Comparative Area Studies; Cultural Anthropology 101, 102; History 193, 194; and Religion 160, 161. One course each. *Khanna or staff*

105A. Technology, the Environment, and Modern Culture. A course designed to emphasize the dimension of technology in the FOCUS Program, Science, Technology, and Modern Culture, and to provide a forum for discussing the relationship among the other courses in the program. Open only to students in that FOCUS Program and required of them. Pass/fail grading only. Half course. *FOCUS Program faculty*

105B. Issues of Contemporary American Culture. Open only to students in the FOCUS Program, Twentieth-Century America, and required of them. Intended to provide a forum for relating the other courses in the program. Weekly papers and discussion based on a series of programs and readings. Pass/fail grading only. Half course. *FOCUS Program faculty*

105C. Issues in Contemporary Global Culture. Viewed from indigenous and western perspectives. Open only to students in the FOCUS Program, Contemporary Global Culture, and required of all students in the program. Designed to provide a forum to develop the relationship among the other four courses in the program. Required reading, discussion, and occasional papers. Pass/fail grading only. Half course. *FOCUS Program faculty*

105D. Symposium in Evolution and Humankind. A weekly discussion meeting intended to encourage participants in the FOCUS Program, Evolution and Humankind, to discuss interdisciplinary and synthetic topics emerging from their experiences in the program's constituent seminars. Open only to participants in the FOCUS Program. Pass/fail grading only. Half course. *FOCUS Program faculty*

105E. Issues in Late Medieval Europe. All students in the FOCUS Program in Medieval and Renaissance Studies meet weekly with faculty and FOCUS coordinator for discussion in this course, which bridges issues raised in the separate program courses and offers fresh perspectives on those issues. Open only to participants in the FOCUS Program and required of them. Pass/fail grading only. Half course. *FOCUS Program faculty*

106. Introduction to the Study of Literature and Society. (AL) See C-L: Literature 101; also C-L: Comparative Area Studies. One course. *F. Lentricchia or Willis*

108S. Science, Technology, and Human Values. (SS) Open to juniors and seniors in the Science, Technology, and Human Values Program and to other seniors if space is available. Consent of instructor required. One course. *Vesilind and staff*

111. Introduction to Linguistics. (SS) See C-L: Cultural Anthropology 107; also C-L: English 111 and Linguistics. One course. *Butters or Tetel*

112S, 113S. Topics in Science, Technology, and Human Values. Six four-week segments offered sequentially over the fall and spring semesters by faculty of the Program in Science, Technology, and Human Values. Credit for 112S or 113S is awarded for completion of three to five segments within a single academic year; credit for 112S and 113S for completion of six segments. Only students who take three segments in the fall semester should register for 112S; those who take no more than two segments in the fall and one or more segments in the spring semester should register instead for 113S in the spring. One course each. *Vesilind and staff*

115D. Perspectives in Gay, Lesbian, and Bisexual Studies. (CZ) Topics include homosexuality and history, religion, law, education, the arts and literature, the military, and the health sciences addressed. C-L: English 101D. One course. *Staff*

118. Austrian Culture and Politics: Introduction to the Culture and Political Systems of Austria. (CZ) Offered as a part of the Duke in Vienna Program. One course. *Staff*

119. Current Topics in Linguistics. (SS) See C-L: Cultural Anthropology 112; also C-L: English 119 and Linguistics. One course. *Staff*

120. Perspectives on Food and Hunger. (SS) Issues of food and hunger from an interdisciplinary perspective. Lectures present analytic approaches from the natural sciences, social sciences, and the humanities. Pass/fail grading only. C-L: Comparative Area Studies. Half course. *Johns*

120A. Perspectives on Food and Hunger. (SS) See Interdisciplinary Course 120. Lectures, weekly discussion meetings, and individual research. C-L: Comparative Area Studies and Political Science 176A. One course. *Johns*

120B. Perspectives on Food and Hunger. (SS) See Interdisciplinary Course 120. Lectures, community internship project, and discussion meetings. C-L: Comparative Area Studies and Political Science 176B. One course. *Johns*

124. Human Development. (SS) Biological, behavioral, and cultural perspectives and approaches. Multidisciplinary. Especially for sophomores. Juniors and seniors by consent only. C-L: Human Development, Psychology 124, and Sociology 124. One course. *Anderson, Gustafson, and staff*

139. Marxism and Society. (SS) See C-L: Cultural Anthropology 139; also C-L: Comparative Area Studies, Education 139, History 186, Literature 139, and Sociology 139. One course. *Staff*

162, 163. Introduction to Islamic Civilization. (CZ) Extensive survey of Muslim peoples and institutions. 162: The Middle Eastern origins and cultural attainments of medieval Islam. 163: Modern developments and global features of the Islamic world. C-L: Comparative Area Studies; Cultural Anthropology 147, 148; History 101G, 102G; Medieval and Renaissance Studies; and Religion 162, 163. One course each. *Cornell, Lawrence, and staff*

164. History and Religions of North Africa. (CZ) See C-L: Religion 164; also C-L: African and Afro-American Studies 164, Comparative Area Studies, and History 187. One course. *Cornell or Lawrence*

180. Psychosocial Aspects of Human Development. (SS) See C-L: Psychology 130; also C-L: Human Development and Sociology 169. One course. *Martin Lakin and Maddox*

182. Media in Comparative Perspective. (SS) Impact of mass media outside the United States. Cross-national comparisons of media content, audiences, and control. Relationships of governments to media and media policies. International flow of media materials and their cross-national impact. C-L: Canadian Studies, Comparative Area Studies, Film and Video, Political Science 180, and Sociology 182. One course. *Smith*

184S. Canadian Issues. (SS) Persistent and current issues facing the Canadian nation-state, among them: cultural and regional political divisions, Indian-Eurocanadian relations, the development of the Canadian welfare state, Canada's place in the international community and in the world economy. Prerequisite: Interdisciplinary Course 98 or consent of instructor. C-L: Canadian Studies, Comparative Area Studies, Cultural Anthropology 184S, Economics 184S, History 184S, Political Science 184S, and Sociology 184S. One course. *Staff*

186S. Research Internship in Primatology. (NS) Part of the Undergraduate Program in Primatology. Supervised work either in a laboratory or at the Primate Center. Consent of instructor required. C-L: Biological Anthropology and Anatomy 186S. One course. *Glander or White*

187S. Senior Seminar in Primatology. (NS) Part of the Undergraduate Program in Primatology. Consent of instructor required. C-L: Biological Anthropology and Anatomy 187S. One course. *Glander or White*

188S. The Diaghilev Ballet, 1909-1929. (AL) Prerequisite: junior or senior standing or consent of instructor. See C-L: Dance 188S; also C-L: Institute of the Arts 121S. One course. *Dickinson and staff*

190. Research Apprenticeship in Human Development. Part of the Undergraduate Program in Human Development. Supervised work may be in a laboratory, project, or organizational setting. Consent of instructor required. C-L: Human Development. One course. *Thompson and staff*

191S. Senior Seminar in Human Development. (SS) Part of the Undergraduate Program in Human Development. Consent of instructor required. C-L: Human Development. One course. *Thompson and staff*

192S. Special Topics in Human Development. (SS) Part of the Human Development Program. Selected theoretical and methodological topics with emphasis on social change and public leadership in aging societies. C-L: Human Development. One course. *Maddox and staff*

198S. Current Topics on Latin America. Interdisciplinary study of geographical, historical, economic, governmental, political, and cultural aspects of modern Latin America and the current issues facing the region. For juniors and seniors. C-L: Comparative Area Studies. One course. *Staff*

199S. Senior Seminar in German Studies. (CZ) Review of current debates and historical perspectives in the German cultural field, structured through contributing disciplines: social and economic history, political theory and history, literature, fine arts, music, philosophy, and religion. Team-taught, involving a wide range of faculty in the German Studies Program. C-L: German 199S. One course. *Rolleston and staff*

234S. Political Economy of Development: Theories of Change in the Third World. (SS) See C-L: Political Science 234S; also C-L: Comparative Area Studies, Cultural Anthropology 234S, History 234S, and Sociology 234S. One course. *Staff*

282S. Canada. (SS) See C-L: History 282S; also C-L: Canadian Studies, Comparative Area Studies, Cultural Anthropology 282S, Economics 282S, Political Science 282S, and Sociology 282S. One course. *Staff*

COURSES CURRENTLY UNSCHEDULED

155. Comparative Perspectives on Literature and Social Change: From Plantation to City. (AL)

205S. Gender and War. (CZ)

Interdisciplinary German Studies Program

Professor Borchardt, *Director*

A certificate, but not a major, is available in this program.

The program provides the opportunity for an interdisciplinary and in-depth study of the culture and civilization of the German-speaking peoples past and present.

Departments cooperating with the program include Art and Art History, Germanic Languages and Literature, History, Music, Philosophy, Political Science, Religion, and Sociology.

Students in the program will earn an Interdisciplinary German Studies Certificate after taking two years of German language study (or the equivalent) in the Department of Germanic Languages and Literature; an interdisciplinary capstone course; and four additional courses drawn from a large list of Interdisciplinary German Studies courses which must fall within thematic clusters. With the help of the director of the Interdisciplinary German Studies Program, it is possible for a student to design a curriculum that accommodates unusual interests.

Students may also elect this interest in Germany while participating in a Duke-approved study abroad program either during a summer or during their junior year.

Duke offers its own summer program at the Friedrich-Alexander University in Erlangen/Nürnberg and spring and fall semester programs at the Berlin universities. For further information consult the director of the program, 104 Foreign Languages Building.

Italian

For courses in Italian, see Romance Studies.

Japanese

For courses in Japanese, see Asian and African Languages and Literature.

Judaic Studies Program (Center for Judaic Studies)

Associate Professor Bland (religion), *Director* and *Director of Undergraduate Studies*; Professors Alt (Germanic languages and literature), C. Meyers (religion), E. Meyers (religion), and Wintermute (religion); Associate Professor Bailey (Divinity School)

A program in Judaic studies may be taken as part of a major in religion or as a supplement to any other major. It may also be taken under Program II. Students are eligible for a certificate in Judaic studies after completing four courses in the program. For descriptions of the courses consult the listings under the specified departments.

German (Yiddish)

1, 2. Elementary Yiddish. *Staff*

Hebrew

1, 2. Elementary Modern Hebrew. *Zakim*

63, 64. Intermediate Modern Hebrew. *Zakim*

125, 126. Advanced Modern Hebrew. *Zakim*

181. Hebrew Literature in Translation: Culture and Ideology in Modern Hebrew Fiction. *Zakim*

191, 192, 193, 194. Independent Study. *Staff*

Interdisciplinary Course

99. Perspectives in Archaeology. *C. Meyers, E. Meyers, Younger, and staff*

Literature

131. Special Topics in Literature and the Judaic Tradition. *Staff*

Religion

40. Judaism. *Bland, E. Meyers, or staff*

50. The Old Testament: Hebrew Bible. *C. Meyers, E. Meyers, Peters, or Wintermute*

101. Selected Studies in the Bible: Prophets. *Staff*

102. Selected Studies in the Bible: Writings. *Staff*

105. Theology of the Old Testament. *Wintermute*

109. Women in the Biblical Tradition: Image and Role. *C. Meyers*

110. Archaeology and Art of the Biblical World. *C. Meyers or E. Meyers*

115-116. Introduction to Biblical Hebrew. *Bailey*

134. Jewish Mysticism. *Bland*

136. Contemporary Jewish Thought. *Bland or E. Meyers*

- 195B, 196B. Junior-Senior Seminars: Jewish and Christian Traditions. *Staff*
 207, 208. Intermediate Biblical Hebrew. *Staff*
 220. Rabbinic Hebrew. *E. Meyers or staff*
 221. Readings in Hebrew Biblical Commentaries. *Bland*

Opportunities for independent study are also offered in the Department of Religion under 191, 192, 193, 194. Procedures for registration and applications are available in 118 Gray Building.

Special attention is directed to those courses in New Testament which are relevant to the study of Rabbinic Judaism—Religion 106, 107, 108, and 111. A list of appropriate courses at the University of North Carolina at Chapel Hill is available in 230C Gray Building, Duke University, and in 101 Saunders Hall, University of North Carolina, Chapel Hill and may be taken under the rubric of the Cooperative Program in Judaic Studies.

Korean

For courses in Korean, see Asian and African Languages and Literature.

Latin

For courses in Latin, see Classical Studies.

Linguistics Courses

Students interested in the study of language as part of their undergraduate program or as preparation for graduate work in linguistics should consult the instructors of the courses listed below or Associate Professor Pugh, co-chair, Committee on Linguistics, 316 Languages Building. Students may concentrate in linguistics through Program II. For descriptions of the following courses see the listings of the specified departments.

Balto-Finnic

200. Balto-Finnic Linguistics. *Pugh*

Chinese

146. Fundamentals of the Structure of Chinese. *Zhang*

Cultural Anthropology

107. Introduction to Linguistics. *Butters or Tetel*
 112. Current Topics in Linguistics. *Staff*
 119. Language, Culture, and Society. *Apte, O'Barr, or Strauss*
 211S. Ethnography of Communication. *Apte or O'Barr*
 250S. Culture and Discourse. *Apte, Ewing, O'Barr, Quinn, or Strauss*

English

111. Introduction to Linguistics. *Butters or Tetel*
 112. English Historical Linguistics. *Butters or Tetel*
 113A. Introduction to Old English. *Staff*
 118S. The Teaching of Composition, Grammar, and Literature in the Secondary School. *Staff*
 119. Current Topics in Linguistics. *Staff*
 205. Semiotics and Linguistics. *Andrews*
 207A. Introduction to Old English. *Staff*

French

- 131S. French in the New World. *Thomas*
 210. The Structure of French. *Thomas*
 211. History of the French Language. *Thomas*

German

260. History of the German Language. *Rasmussen*
 262. Applied Linguistics. *Staff*

Interdisciplinary Courses

111. Introduction to Linguistics. *Butters or Tetel*
 119. Current Topics in Linguistics. *Staff*

Philosophy

- 103. Symbolic Logic. *Brandon or Posy*
- 109. Philosophy of Language. *Posy*
- 228S. Recent and Contemporary Philosophy. *Posy*
- 250S. Topics in Formal Philosophy. *Posy*

Psychology

- 134. Psychology of Language. *Day*
- 138. Language Development. *Mazuka*

Russian

- 119. Topics in Slavic and Northern European Languages. *Staff*
- 150. The Languages of the Soviet Union. *Pugh*
- 185S. Introduction to Slavic Linguistics. *Andrews*
- 186S. History of the Russian Language. *Pugh*
- 201S. A-D. Topics in Comparative Slavic Linguistics. *Andrews or Pugh*
- 203S. Old Church Slavonic. *Pugh*
- 205. Semiotics and Linguistics. *Andrews*
- 207S. Semantics. *Andrews*
- 208. Scientific Russian. *Maksimova*

Spanish

- 109S. Structure of Spanish. *Staff*
- 210. History of the Spanish Language. *Garci-Gómez*

Literature Program (LIT)

Professor Jameson, *Chair*; Associate Professor Kaplan, *Director of Undergraduate Studies*; Professors Fish, F. Lentricchia, Mignolo, Moi, V. Mudimbe, Radway, Rolleston, Schor, B. H. Smith, Stewart, Surin, Thomas, and Tompkins; Associate Professor Gaines; Research Professor Dorfman. Affiliated faculty: Professors Clum (English), Cooke (Asian and African languages and literature), and Torgovnick (English); Associate Professors Burian (classical studies), Morton (Germanic languages and literature), Wang (Asian and African languages and literature), and Willis (English); Assistant Professor Moses (English)

A major is available in this program.

20S. Introduction to Literature. (AL) Introduction to the study of literature and other forms of cultural expression, such as film. Different introductory approaches will be used in each section (for example, a systematic account of literary genres, a historical survey of ideas and forms of fiction, concepts of authorship and subjectivity, or of literary meaning and interpretation). More than one national literature or culture represented. One course. *Staff*

25. Third World Novel and Film. (AL) Exemplary novels and films from China, India, the Philippines, the Arabic world, and Latin America dramatizing a range of cultural responses to the social, political, and intellectual problems of postcolonial societies. Topics include the conflict between the old and the new; language revolution; the drama of family and clan; nationalism, nativism, and culturalism; the status of the intellectual; the arrival of consumerism; and the status of women. Open only to students in the FOCUS Program, Contemporary Global Culture. One course. *Staff*

25A. Third World Novel and Film. (AL) Same as Literature 25 but open to students not in FOCUS Program. One course. *Staff*

27S. Reading for Yourself. Literature as a point of departure for asking questions about how people learn. The literary texts used as means of exploration of the self, of the environment, and of our relationship to one another. Pass/fail grading only. One course. *Tompkins*

30. Special Topics in National Cinema. (AL) Understanding nationhood through film culture. Industrial base, reception history, and critical context for development of

national cinemas. Exemplary films from a range of periods. C-L: Comparative Area Studies and Film and Video. One course. *Staff*

31. Special Topics in Hispanic Cinema. (AL) Focus on images of resistance in cinema from Spain and Latin America. Bunuel, followed by Spanish film under Franco compared with "Third Cinema" in Latin America. Course conducted in English. Knowledge of Spanish helpful but not required. C-L: Film and Video. One course. *Staff*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

50. What Is Literature? (AL) Introduction to the idea of literature from an innovative and questioning position, to a number of major modern thinkers, and to theory in general. The relationship of literature to history; theories of reading and interpretation; and the concepts and structures of thought associated with modernism and postmodernism. One course. *Staff*

60. Contemporary Literary and Cultural Theory: An Introduction. (AL) The major concepts and principles of contemporary literary theory. "Poststructural" approaches to language and textuality, the invention of "postmodernism," and theories of history and literature. Vocabulary and tools necessary for reading and understanding contemporary critical and theoretical texts. One course. *Staff*

100. Introduction to Comparative Literature. (AL) Basic structures of literature understood as fiction-making: the journey, the hero, the storyteller, the goal of community. Texts from the *Odyssey* to contemporary works, with an introduction to theoretical issues. One course. *Rolleston*

101. Introduction to the Study of Literature and Society. (AL) Literature in relation to history, social situation, and culture. Development of modes of interpretation that juxtapose textual features and broader contextual concern. Readings from Western and non-Western sources representative of a number of periods and genres. C-L: Comparative Area Studies and Interdisciplinary Course 106. One course. *F. Lentricchia or Willis*

102. Introduction to Cultural Studies. (AL) See C-L: English 101B; also C-L: Film and Video. One course. *Gaines, Radway, Surin, Tompkins, or Willis*

103. Great Books in the Western Tradition. (AL) A group of texts central to Western cultural identity from antiquity to the modern age, examined from a variety of critical and theoretical perspectives. Texts and topics vary according to the specializations of participating faculty, but in every case attention is given to such fundamental issues as the representation of "human nature;" the relations of individual and society, human and divine, male and female; the transmission and interrogation of ideas and values in literature; and the function of narrative itself in Western culture. One course. *Burian, Janan, or Morton*

121. Introduction to Asian and African Literature. (AL) See C-L: Asian and African Languages and Literature 121. One course. *Staff*

122. The American Imagination. (AL) A syncretic approach to the literature of the Americas, North and South, drawing attention to the underlying homogeneity of New World culture. Borges, Faulkner, Garcia Marquez, Melville, Neruda, Thoreau, and others. One course. *Staff*

125. Art and Philosophy from West Africa to the Black Americas. (AL) See C-L: Art 174; also C-L: African and Afro-American Studies 154 and Comparative Area Studies. One course. *Powell*

126. Art and Material Culture of the Southern United States. (AL) See C-L: Art 175. One course. *Powell*

127. The Blues Aesthetic: Afro-American Art in the Twentieth Century. (AL) See C-L: Art 176; also C-L: African and Afro-American Studies 156. One course. *Powell*

129. Latin-American Literature in Translation. (AL) See C-L: Spanish 121; also C-L: Comparative Area Studies. One course. *Dorfman*

131. Special Topics in Literature and the Judaic Tradition. (AL) Selected topics or areas of the writings of the Judaic tradition such as ancient or modern Hebrew literature, Yiddish literature, Jewish mystical philosophy or the literature of the Holocaust. C-L: Judaic Studies and Yiddish 170. One course. *Staff*

132. Dada and Surrealism. (AL) The international dada and surrealist movement in its multiple manifestations: theater, painting, novel, film, autobiography, and manifesto. Knowledge of French or German desirable. C-L: Comparative Area Studies. One course. *Thomas*

133. Love, Marriage, and Adultery in the Nineteenth-Century European Novel. (AL) Focus on the tradition of the adulterous woman; her transgression of the social norms as a condensed passionate representation of the social, moral, and sexual conflicts of the time. Attention to questions of realism, genre, and plot structure. One course. *Moi*

134. Women in Jewish Literature. (AL) The development of images of Jewish women from biblical times to the present, in works for and about women, written by both male and female authors. Focus on literary craftsmanship as well as religious, historical, and political context. Texts include biblical works, Talmudic material, and selections from Yiddish, Hebrew, and Anglo-Jewish writers. C-L: Judaic Studies and Women's Studies. One course. *Staff*

135. National Identity. (AL) A study of literature that aims to define national experience. Topics might include the study of events (such as revolution, civil war) that foster national identity or put it into question, the notion of "imagined communities" and competing cultures, issues of national memory and amnesia and the intersection of gender with national identity. May be taught by a single faculty member or in teams. C-L: Comparative Area Studies. One course. *Hell, Kaplan, Longino, and/or Stewart*

136. Autobiography Across Cultures. (AL) A comparative approach to autobiography (including European language memoir, United States slave narrative, Latin American *testimonio*). How do people from different cultures and political situations tell the story of themselves? How does the relationship of individual to community vary according to these traditions and situations? Do men and women "construct a self" differently? C-L: Comparative Area Studies and Women's Studies. One course. *Kaplan or Willis*

137. Contemporary Culture in South Asia. (CZ) See C-L: Asian and African Languages and Literature 137; also C-L: Comparative Area Studies. One course. *Khanna*

139. Marxism and Society. (SS) See C-L: Cultural Anthropology 139; also C-L: Comparative Area Studies, Education 139, History 186, Interdisciplinary Course 139, and Sociology 139. One course. *Staff*

142S. Women in Arab Literature. (AL) See C-L: Asian and African Languages and Literature 173S; also C-L: Women's Studies. One course. *Cooke*

143. Canon and Corpus: Literary Studies in Colonial Situations. (AL) The function of literary studies in the context of the humanities and in a world of rapid changes and increasing internationalization. One course. *Mignolo or Willis*

144. Special Topics in Third World or Postcolonial Literature. (AL) Colonial and postcolonial literatures of India, New Zealand and Australia, Canada, Francophone and

Anglophone Africa, the Caribbean, North and South America. Organized according to trends, topics, and genres. One course. *A. Davidson, Ferraro, Moses, or Willis*

146. The Canadian Image: Cultural Production in French and English Canada. (AL) What image do Canadians generate of themselves and the world and why? Popular and experimental work in English and French Canadian arts—primarily film and literature, but some painting and music—studied for their meaning in the making or unmaking of a social and political identity and a national image, from the 1960s to the present. C-L: Canadian Studies, Comparative Area Studies, and Film and Video. One course. *A. Davidson*

148S. Literature and Revolution: From the May Fourth to the Post-Mao Era. (AL) See C-L: Chinese 148S; also C-L: Comparative Area Studies. One course. *Wang*

149. Feminism in Twentieth-Century Art. (AL) See C-L: Art 186; also C-L: Women's Studies. One course. *Stiles*

150. Special Topics in Philosophy and Literature. (AL) The great philosophical texts or movements as expressive and linguistic phenomena; either with individual major figures such as Freud, Marx, Nietzsche or Hobbes, or with key theoretical and philosophical movements which have generated a body of texts significant for their literary as well as their philosophical value. One course. *Jameson, Moi, or staff*

151. Special Topics in Women Writers of the World. (AL) Issues of gender and representation in works by women from the Middle Ages to the modern period. Concentration on specific periods, areas, or themes. Relationship of women's literature to the other arts, political practices, and social developments. C-L: Comparative Area Studies and Women's Studies. One course. *Staff*

152. Special Topics in Regional Literatures of the Western World. (AL) Period documents—letters, memoirs, medical treatises, diaries, police records, court decisions, maps (studied together with poetry, short stories, plays)—meant to recreate a picture of life in a city and a region in particular moments in history. C-L: Comparative Area Studies. One course. *Staff*

156. History of Mass Culture in the United States. (AL) See C-L: English 156. One course. *Gaines, Radway, Tompkins, or Willis*

157. International Popular Culture. (AL) Basic concepts in critical theory; folk vs. mass culture, appropriation, resistance, hegemony, as studied through Japanese, Chinese, Australian, British, East Indian, and Latin American popular forms. American imperialism and the exportation of mass forms juxtaposed with international reception of popular fiction, characters, music, and television programs. C-L: Comparative Area Studies and Film and Video. One course. *C. Davidson, Gaines, Radway, or Willis*

158. Studies in Comparative World Cinema and Television. (AL) History and theory of film and video technology across nations; postcolonial patterns and their electronic and mechanical transmission; economics of distribution, reception, exhibition, and their relation to aesthetics. The first world defined against the second and third by means of cultural product. C-L: Film and Video. One course. *Staff*

163. Twentieth-Century American Art: Identity and Nationalism. (AL) See C-L: Art 163. One course. *Powell*

167. Twentieth-Century Art, 1900-1945: The Avant-garde and Modernism. (AL) See C-L: Art 167; also C-L: Comparative Area Studies. One course. *Cernuschi or Stiles*

168. Art since 1945: Modernism and Postmodernism. (AL) See C-L: Art 168; also C-L: Comparative Area Studies. One course. *Cernuschi or Stiles*

171. The History of Conceptual Art. (AL) Not open to students who have taken Art 177A. See C-L: Art 177; also C-L: Comparative Area Studies. One course. *Stiles*

172. Documentary Photography and Social Activism in the Nuclear Age. (AL) Not open to students who have taken Art 177B. See C-L: Art 169; also C-L: Comparative Area Studies. One course. *Stiles*

173S. Drama and Theater from 1590 to 1700. (AL) See C-L: Drama 151S; also C-L: English 174A. One course. *Clum or Randall*

174. World Theater: Realism and Modernisms. (AL) See C-L: Drama 152; also C-L: English 174B. One course. *Clum or Riddell*

175A. Modernism and Modernity I. (AL) The classic phase of modernism: a new, experimental writing emerging from and responding to a new social and political world. Authors studied include Ibsen, Strindberg, Chekhov, Yeats, Joyce, Kafka, and Eliot. One course. *Lentricchia*

175B. Modernism and Modernity II. (AL) The self-conscious phase of modernism; experimental art turned upon itself. Poetry as the subject of the poem. Authors studied include Pirandello, O'Neill, Beckett, Stevens, Borges, Barthelme, Calvino, Fellini, and DeLillo. One course. *Lentricchia*

176. The History of Performance Art. (AL) See C-L: Art 179; also C-L: Comparative Area Studies. One course. *Stiles*

177. Film Theory. (AL) Recent critical developments in Marxist aesthetics, structuralism, semiotics of the image, feminist film theory. Both experimental and Hollywood narrative films. C-L: Film and Video and Women's Studies. One course. *Gaines*

178. Soviet Cinema. (AL) See C-L: Russian 130; also C-L: Film and Video. One course. *Gaines, Jameson, and Lahusen*

179. Contemporary Science Fiction. (AL) Major writers in the tradition of utopia and science fiction since the 1960s, in particular LeGuin, Dick, and Delany. The formal distinction between science fiction and fantasy, innovations in narrative structure, concepts of utopia and dystopia, and the relationship between the genre and the social history of the 1960s and 70s. One course. *Staff*

180. Writings in the Rural Tradition: From the Caribbean to the American South. (AL) Comparative readings of fiction and poetry from the southern United States and the Caribbean, analyzed in relation to the plantation heritage. C-L: African and Afro-American Studies 180, Comparative Area Studies, and English 180. One course. *Willis*

181. Literacies and Literatures in the Americas and the Caribbean. (AL) An exploration of the social process as well as historical and cultural relevance of the uses of literacy in multilingual and pluricultural realities of the Americas and the Caribbean. C-L: Comparative Area Studies. One course. *Mignolo or Willis*

184. Introduction to Psychoanalytic Criticism. (AL) Emphasis on texts by Freud and Lacan and the textual theories closely associated with their work. Psychoanalytic theories of art and creativity ranging from Ernest Jones and Hanna Segal to Janine Chasseguet-Smirgel, Sarah Kofman, and Julia Kristeva. Various theories of the relationship between the psychological and the social. One course. *Moi*

185. Psychoanalysis, Literature, and Film. (AL) Genres, styles, and schools in film and literature that attract psychoanalytic readings and raise issues of gender and sexuality: the gothic, horror, melodrama, and romance fiction; surrealism and the avant-garde. C-L: English 181, Comparative Area Studies, Film and Video, and Women's Studies. One course. *Gaines*

186. Sexualities in Film and Video. (AL) The variety of ways sexualities are represented in current mainstream and avant-garde film and video art. Topics include voyeuristic, narcissistic, and other perverse pleasures; modes of representing bodies, genders, and desires (especially gay and lesbian ones) in relation to national and subcultural identities. Readings in film theory as well as related literary and critical texts. C-L: Film and Video. One course. *Clum, Gaines, or Moon*

187. Studies in Film History. (AL) See C-L: English 185; also C-L: Drama 136 and Film and Video. One course. *Clum, Gaines, or Jameson*

188. Twentieth-Century Modernist and Postmodernist Criticism. (AL) See C-L: Art 188. One course. *Cernuschi or Stiles*

189. Modern and Postmodern Architecture. (AL) See C-L: Art 189. One course. *Wharton*

190S. Senior Seminar. (AL) Topics vary each semester offered. One course. *Staff*

191, 192. Independent Study. Consent of instructor required. One course each. *Staff*

194S. Topics in Advanced Film, Video, or Audio Production. (AL) An in-depth investigation of a particular technology. Exploration of the theoretical assumptions behind the development of new technological arts of the twentieth century. Consent of instructor required. C-L: Film and Video. One course. *Staff*

195S. Documentary Film and Fiction. (AL) The study of different documentary forms such as fiction, nonfiction, video, and film, focusing on the way that historical and political contexts relate to them. Examples include Don DeLillo, Marcel Ophuls, Joyce Carol Oates, and Christa Wolf. Open to juniors and seniors only. One course. *Kaplan and Orr*

198. Censorship, Law, and Literature. (AL) The history and theoretical implications of censorship as a worldwide phenomenon that, from Plato's time to our own, illuminates many other issues: the role of law in mediating culture; the role of literature in testing the frontiers of cultural change; the relationship between political structures and private, sexual morality. Emphasis on censorship law internationally, on its relation to treason, sedition and libel laws, and the concept of heresy. Clarification of First Amendment issues, and interpretation of certain crucial "literary" trials, such as those concerning Flaubert's *Madame Bovary*, Joyce's *Ulysses*, and Lawrence's *Lady Chatterly's Lover*. Broad historical and international focus also maintained. One course. *Staff*

211. Theory and Practice of Literary Translation. (AL) Linguistic foundations and historical role of translation. Practical exercises and translation assignments. Prerequisites: working knowledge of a foreign language and consent of instructor. One course. *Burian*

212. Studies in Narrative. (AL) Topics to vary. One course. *Staff*

254. Introduction to Feminism. (AL) Major trends and tendencies of feminist theory and its history. Perspectives are both international as well as Third World and interdisciplinary. Various feminist methodologies as well as crucial polemics. One course. *Moi, Radway, or Schor*

280. Semiotics for Literature. (AL) See C-L: French 223. One course. *Thomas*

293. Seminars in Literature and History. (AL) Relationship of literary texts to varieties of historical experience such as wars, periods of revolutionary upheaval, periods of intense economic growth, "times of troubles," or stagnation. Literary texts and historical content posed in such formal ways as the theoretical problem of the

relationship between literary expression and form and a range of historical forces and phenomena. One course. *Jameson, Kaplan, Orr, or Schor*

COURSES CURRENTLY UNSCHEDULED

128. *Writings in the Pan-African Tradition.* (AL)

145. *The Descent of the Epic.* (AL)

155. *Comparative Perspectives on Literature and Social Change: From Plantation to City.* (AL)

159. *Tragedy and the Tragic.* (AL)

THE MAJOR

All students must be able to demonstrate reading knowledge of at least one foreign language either through advanced placement or completion of the appropriate course work. In addition, literature students will be asked to fulfill the requirements in one of two tracks. When students declare the literature major, they will be asked to inform the director of undergraduate studies of the track selected and to work out a tentative course of study.

(1) *Literature and Cultural Theory*

This track has been designed to enable students to concentrate their efforts upon a comparative study of world literatures. It is understood that the director of undergraduate studies will encourage majors in this track to develop a coherent rationale for the kind of comparisons they are undertaking (for example, of specific national literatures, within a particular historical period) and will ensure that students take an appropriate number of more theoretical courses as well. Students will be required to take a total of eight courses distributed in the following manner.

a. *One* course (appropriate to the student's particular interests) which engages the idea of literature from a theoretical, procedural, or comparative perspective. Students should choose from the following list of courses: Literature 50, 100, 101, and 102.

b. *Five* courses in the Program in Literature to be approved by the director of undergraduate studies.

Students who are not completing honors in the program must plan to include at least one seminar course among these five. This requirement will normally be fulfilled by taking Literature 190, the senior seminar. The seminar will be a topical, problem-oriented seminar focused on a broad subject such as society and psychoanalysis. The point of the course will be to raise theoretical questions and to enable the students to think more systematically about the procedures, rationale, and methods of literary study. Non-honors students will be asked to submit a substantial research paper at the end of the course.

Honors students will be asked to include two seminar courses among their five. This requirement will be fulfilled by taking Literature 190, the senior seminar, in the fall of the senior year, and Literature 191, the honors thesis, in spring of the senior year. Students must apply for this honors sequence by February 1 of the junior year. Applicants must have completed at least two Literature Program courses and one course in the literature of a foreign language and have a minimum B+ average in those courses. Applicants should apply to the director of undergraduate studies and must include both a writing sample and a letter from one of their instructors. The Literature Program's honor's committee will evaluate all applications and the final theses themselves. Students not awarded the honors designation will receive graded credit for Literature 190 and Literature 191.

c. *Two* courses in literature taught in a foreign language. The topics, periods, and foci of these courses should intersect in some way with the courses elected from within the Literature Program.

(2) Literature and Media Studies

This track has been designed to meet the needs of the many students who wish to elect a literature major but who want to concentrate more specifically upon the contemporary media and their attendant technologies. Students will be asked to develop a rationale for their course selection and to demonstrate to the director of undergraduate studies that they have addressed both theoretical and substantive questions in the courses they have taken. Students will be required to take a total of eight courses distributed in the following manner:

a. Literature 102, Introduction to Cultural Studies.

b. *Three* courses in the Program in Literature. Non-honors students must include one seminar course among these three. This requirement will normally be fulfilled by Literature 190, the senior seminar. Honors students must include two seminar courses among these three. This requirement will be fulfilled by Literature 190 and Literature 191. For honors procedures, see listing under Track (1).

c. *Two* courses in literature from the following list: Literature 156, 177, 179, 185, and 187.

d. *One* course from outside the Literature Program in the area of media studies (for example, English 187, Cultural Anthropology 110, Public Policy Studies 163S, Public Policy Studies 177S, Public Policy Studies 180S). This course must be approved by the Director of Undergraduate Studies.

e. *One* literature course in a foreign language at the 100 level or above.

Management Sciences Courses (MS)

The courses listed below are elective courses, which do not count for area of knowledge requirements in Trinity College. A major is not offered in management sciences. The courses may be helpful in preparation for graduate education in business and law and may provide liberal arts, science, and engineering students an advancement in placement.

53. Introductory Financial Accounting. The accounting model of the firm and transactions analysis. Topics include the procedures used to process accounting data, issues in asset valuation and income determination, and financial statement analyses. Prerequisite: sophomore standing. One course. *Staff*

120. Managerial Effectiveness. Understanding the nature of management and the factors that influence the effective performance of managers. Topics include the nature of managerial effectiveness; managing groups; leadership strategies; performance motivation and appraisal; conflict management; the manager as decision maker and negotiator. Prerequisite: junior standing. One course. *Staff*

137. Managerial Accounting. The use of accounting information by management in short-term planning, control, and decision making in business enterprises. Cost accumulation, cost analysis, cost estimation, the development of standards, introduction to budgeting, and short-run decisions. Prerequisite: Management Sciences 53 or consent of instructor. One course. *Staff*

161. Marketing Management. The role of the marketing function in business; product planning, price, promotion, and distribution as elements of a total marketing mix. Formal models in solving the marketing mix problem of the firm. Prerequisite: junior standing. One course. *Staff*

193, 194. Independent Study. Directed reading and research. Open only to qualified juniors and seniors with consent of instructor and director of undergraduate studies. Variable credit. *Staff*

Marine Biology

For courses in marine biology, see Biology, Environment (School), and the University Program in Marine Sciences.

The University Program in Marine Sciences

Professor Ramus (botany and environment), *Director*; Professor Forward (zoology and environment), *Assistant Director* and *Director of Undergraduate Student Affairs*; Professors Barber (botany, environment, geology, and zoology), C. Bonaventura (cell biology and environment), J. Bonaventura (cell biology and environment), Gutknecht (cell biology and environment), Pilkey* (geology), and Searlest (botany); Associate Professor Rittschof (zoology and environment); Assistant Professors Gerhart (environment), Howd (environment), and Lozier (environment); Professor Emeritus Bookhout (zoology); Professor of the Practice Orbach (environment); Associate Professor of the Practice Kirby-Smith (environment); Associate Research Professor Brouwer (environment); Assistant Research Professor Scholz (environment)

The interdisciplinary program in marine sciences provides students with a unique opportunity to live and study at the Duke University Marine Laboratory for a full academic semester—fall or spring or during the summer terms. The program emphasizes small class size, independent study, and integrated classroom, laboratory, and field experience. Students have daily access to modern scientific equipment, a specialized library, and the surrounding natural marine environment.

The fall and spring semesters are offered primarily for juniors and seniors. Participation in either the fall or spring semester is possible for all majors with appropriate preparation. Before attending a semester program, it is advised that students have completed introductory college courses in biology, chemistry, mathematics, and physics. Students wishing to apply to the fall or the spring semester must submit an application form which contains the written approval of their faculty advisor to the Admissions Office, Duke University, School of the Environment, Marine Laboratory, Beaufort, North Carolina 28516-9721, prior to Duke's registration period for the desired semester. Students will be notified of the action of the Admissions Committee shortly after receipt of their application. Applications received after Duke's registration period for the desired semester will be considered if space is available.

The summer curriculum, taught in three terms, includes a rich assortment of courses in the natural sciences. Attention is also directed to the introductory course in marine biology (Biology 10L), designed specifically for students not majoring in a natural science.

Applications for summer courses must contain the written approval of the student's advisor or dean, must be accompanied by a current academic transcript and should be submitted by the end of March or earlier to the address indicated above. Thereafter, applications will be considered if space is available.

A number of summer tuition scholarships are available on a competitive basis. Please consult the *Marine Laboratory 1994* publication for specific requirements and deadline dates, or contact the Admissions Office of the Marine Laboratory.

The courses below are described in the bulletin listings of the specified departments. See also the *Marine Laboratory 1994* publication and the Duke University Official Schedule of Courses for the current schedule of courses. For information on courses fulfilling

*Spring only.
†Summer only.

requirements of the biology, environmental studies and policy, or geology major consult the director of undergraduate studies for the major.

FALL, SPRING, OR SUMMER COURSES AT BEAUFORT

Marine Biology. (Biology 10L.) For students not majoring in a natural science. One course. *Staff*

Climatic Change. (Geology 109 or Geology 209.) For Geology 209, additional requirement of term paper. One course. *Johnson*

Behavioral Ecology. (Biology 113L.) Prerequisite: Biology 21L, 22L. One course. *Rubenstein (visiting summer faculty)*

Biological Oceanography. (Biology 114L.) Prerequisite: Biology 21L, 22L. One course (fall or spring); one and one-half courses (summer). *Barber or Ramus*

Biology of Marine Macrophytes. (Biology 117L.) Prerequisites: Biology 21L, 22L; and Chemistry 11L, 12L or equivalent. One course. *Ramus*

Analysis of Ocean Ecosystems. (Biology 123.) Prerequisite: one year of biology and chemistry, or consent of instructor. One course. *Barber*

Physiology of Marine Animals. (Biology 150L.) Prerequisites: Biology 21L, 22L; and chemistry. One course (fall or spring); one and one-half courses (summer). *Forward*

Biochemistry of Marine Animals. (Biology 155L.) Prerequisites: Biology 21L, 22L; and Chemistry 11L, 12L. One Course. *Rittschof*

Marine Communities. (Biology 169L.) Prerequisites: Biology 21L, 22L; and Mathematics 31. One course. *Gerhart*

Marine Invertebrate Zoology. (Biology 176L.) Not open to students who have taken Zoology 274L. Prerequisite: Biology 21L, 22L. One course (fall or spring); one and one-half courses (summer). *Kirby-Smith*

Independent Study. (Biology 191, 192; Environment 191, 192; Geology 191, 192, 195; or as listed under the student's major department.) For junior and senior majors with consent of appropriate director of undergraduate studies and supervising instructor. Credit to be arranged. *Staff*

Light in the Sea. (Biology 195S or Biology 196S.) Half course. *Ramus*

Human Impact on the Natural Environment. (Biology 195S or Biology 196S.) Half course. *Barber*

Beach and Island Geological Processes. (Geology 196S.) Half course. *Pilkey*

Marine Ecology. (Biology 203L or Environment 219L.) Prerequisite: none; suggested—introductory ecology, invertebrate zoology, or marine botany. One and one-half courses. *Gerhart*

Physical Oceanography. (Environment 290 or Geology 203.) Prerequisite: Mathematics 31 and 32 or consent of instructor. One course. *Lozier*

Barrier Island Ecology. (Biology 218L or Environment 218L.) Prerequisite: introductory biology; suggested: course in botany or ecology. One and one-half courses. *Evans, Peterson, and Wells (visiting summer faculty)*

Coastal Processes. (Environment 222S or Geology 201S.) Prerequisites: Mathematics 31 and 32. Half course. *Howd*

Marine Mammals. (Environment 226L.) One course. *Staff*

Coastal Ecotoxicology and Pollution. (Environment 225L.) Prerequisites: introductory chemistry and biology. One course. *Staff*

Marine Policy. (Environment 276S or Public Policy Studies 195S.) One course. *Orbach*

Advanced Research Training in Marine Molecular Biology and Biotechnology. (Cell Biology 235 or Environment 254, or Cell Biology 235L or Environment 254L.) Prerequisite: consent of instructor. One course (Cell Biology 235 or Environment 254); one and one-half courses (Cell Biology 235L or Environment 254L). *Staff*

Environmental Biochemistry. (Cell Biology 243 or Environment 243.) Prerequisite: organic chemistry. One course. *C. Bonaventura and Brouwer*

Cellular and Molecular Research Techniques. (Cell Biology 244 or Environment 244.) Prerequisite: organic chemistry. One course. *C. Bonaventura and Brouwer*

Techniques in Environmental Data Analysis. (Environment 252L or Geology 222.) Prerequisites: Mathematics 31 and 32. One course. *Howd*

Molecular and Cellular Adaptations of Marine Organisms. (Cell Biology 270S or Environment 224S.) Half course. *C. Bonaventura*

Biology of Marine Invertebrates. (Biology 274L or Environment 297L.) Not open to students who have had Biology 176L. Prerequisite: Biology 21L, 22L or equivalents. One and one-half courses. *Dimock (visiting summer faculty)*

Geological Oceanography. (Environment 291S or Geology 205S.) Not open to students who have taken Geology 206S. One course. *Staff*

Marine Animal Navigation. (Biology 295S or Biology 296S.) Half course. *Forward*

Marine Fishes: Selected Topics. (Biology 295S or Biology 296S.) Half course. *Forward and staff*

The Ecology of Chemical Signals. (Biology 295S or 296S.) Half course. *Rittschof*

Natural History of Coastal Marine Systems. (Biology 295S or 296S.) Half course. *Kirby-Smith*

COURSES CURRENTLY UNSCHEDULED

Macromolecules, Ecology, and Evolution. (Biochemistry 245L.)

Marine Biochemistry and Genetics. (Biochemistry 266S.)

Comparative and Evolutionary Biochemistry. (Biochemistry 276L.)

The Ocean's Role in Climate. (Biology 115L.)

Benthic Marine Algae. (Biology 219L or Environment 296L.)

Tropical Seaweeds. (Biology 263L.)

Experimental Ecology of the Marine Intertidal Zone. (Biology 296S.)

The Coastal Environment: Science vs. Policy. (Biology 295S.)

Analysis of Coastal Ecosystems. (Biology 296S.)

Markets and Management Studies

Associate Professor Spenner, *Director*

A certificate, but not a major, is available in this program.

The program offers students the opportunity to take a cluster of courses dealing with problems of how organizations are formed and managed, how transactions between people and organizations are structured in markets, how and why patterns of consumption change, what distinguishes good from bad management in both the practical and ethical sense, how approaches to management and marketing have changed over time, and how these approaches vary from one country and one sector of the economy to another. The program should be of particular interest to students interested in pursuing a career in business.

In addition to offering courses and a certificate on completion of the requirements, the Markets and Management Program also sponsors lectures, films, discussions and internships. It offers career counseling for prebusiness students, who are invited to make use of a resource room (Room 256 in the Department of Sociology) for meetings with faculty and other students in the program, and to consult relevant journals and newspapers. Additional information may be obtained from Professors Spenner or Wilson in the sociology department.

COURSE OF STUDY

The course of study for program participants is intended to be interdisciplinary. The core of the program consists of sociology courses, with a large number of electives available for selection from eight other departments. The certificate requires six courses, two of which must be drawn from a core set of management and markets studies courses. The third core course is to be a capstone course, an advanced sociology seminar in organization theory. The rest of the courses are considered electives, and at least two of these must be taken in departments other than sociology.

PROGRAM COURSES

Core Courses

- Sociology 142. Organizations and Global Competitiveness
- Sociology 144. Organizations and Environments
- Sociology 155. Organizations and Management
- Sociology 158. Markets and Marketing
- Sociology 159. The Sociology of Entrepreneurship
- Sociology 190. Markets and Management (Capstone course)

Elective Courses

- Cultural Anthropology 110. Advertising and Society
- Economics 130. The Changing Role of the Market in the Social System
- Economics 134. Japanese Economy and History
- Economics 140. Comparative Economic Systems
- Economics 165. American International Economic Policy
- Economics 173. Economics of Organization and Management
- Economics 188. Industrial Organization
- Economics 189. Business and Government
- Education 140. The Psychology of Work
- History 143B. The Emergence of Modern Japan
- Interdisciplinary Course 112S, 113S. Topics in Science, Technology, and Human Values
- Management Science 120. Managerial Effectiveness
- Management Science 161. Marketing Management
- Political Science 121. International Organization
- Political Science 147. International Environment Politics and Policies
- Public Policy Studies 145D. Leadership, Policy, and Change
- Public Policy Studies 146. Leadership and Judgment
- Public Policy Studies 195S.61. Corporate Leadership
- Religion 151. Ethical Issues in Social Change and Public Policy
- Religion 174. Technology Assessment and Social Change
- Sociology 110B.01. Comparative Sociology: Asia
- Sociology 112. American Demographics
- Sociology 126. Third World Development
- Sociology 135. Computers and Society
- Sociology 143. Management and Labor Relations
- Sociology 156. Global Contexts of Science and Technology
- Sociology 165. Occupations, Professions, and Careers

Mathematics (MTH)

Professor Schaeffer, *Chair*; Associate Professor Kraines, *Associate Chair*; Associate Professor Scoville, *Director of Undergraduate Studies*; Assistant Professor of the Practice Blake, *Supervisor of Freshman Instruction*; Professors Allard, Beale, Bryant, Hain, Harer, Lawler, Morrison, Pardon, Reed, Rose, Stern, Venakides, Warner, and Weisfeld; Associate Professors Burdick, R. Hodel, Kitchen, Moore, Saper, Schoen, Smith, Trangenstein, and Zhou; Assistant Professors Layton, Yang, and Zheng; Professors Emeriti Carlitz, Dressel, Murray, Roberts, and Shoenfield; Assistant Professor of the Practice Bookman; Research Associate Professor Khan; Adjunct Professor Chandra; Visiting Assistant Professor Vidakovic; Lecturers Dempster and Morris; Instructors Dong, Glotzer, M. Hodel, and Mathews

A major is available in this department.

19. Precalculus Mathematics. (QR) For students with CB Achievement Test scores between 460 and 540 or SAT scores between 500 and 600. Selected topics in algebra, trigonometry, and analytic geometry; projects and writing assignments. Designed to increase the mathematical skills and knowledge of students planning to enroll in Mathematics 31. One course. *Staff*

31. Introductory Calculus I. (QR) Functions, limits, continuity, trigonometric functions, techniques and applications of differentiation, indefinite and definite integrals, the fundamental theorem. One course. *Staff*

31L. Laboratory Calculus I. (QR) Introductory calculus with a computer laboratory component. Emphasis on projects, group work, and written reports. Differentiation, transcendental functions, differential equations, numerical approximations. One course. *Staff*

32. Introductory Calculus II. (QR) Transcendental functions, techniques and applications of integration, indeterminate forms, improper integrals, infinite series. Not open to students who have had Mathematics 41. Prerequisite: Mathematics 31 or 33. One course. *Staff*

32L. Laboratory Calculus II. (QR) Second semester of introductory calculus with a computer laboratory. Emphasis on projects, group work, and written reports. Integration, the fundamental theorem, methods of integration, improper integrals, polynomial approximation. Not open to students who have had Mathematics 41. Prerequisite: Mathematics 31L or consent of instructor. One course. *Staff*

32X. Introductory Honors Calculus II. (QR) Similar to Mathematics 32, but faster paced and more challenging. Open to students who score at least 750 on the SAT Mathematics Aptitude Test. One course. *Staff*

41. One Variable Calculus. (QR) Meets five times a week, quickly reviews differential calculus and then covers integral calculus and infinite series. Designed for freshmen who have had a year of calculus in high school and have Mathematics SAT scores of 650 or above, but who have not received advanced placement credit for Mathematics 31. Not open to students who have had Mathematics 31 or 32 or 31L or 32L. One and one-half courses. *Staff*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

103. Intermediate Calculus. (QR) Partial differentiation, multiple integrals, topics in differential and integral vector calculus. Prerequisite: Mathematics 32, 32L, or 41. One course. *Staff*

103L. Laboratory Calculus III. (QR) Intermediate calculus with a computer laboratory. Emphasis on projects, group work, and written reports. Curves in space, partial differentiation, multiple integrals, two-dimensional vector calculus. Prerequisite: Mathematics 32, 32L, or 41, or consent of instructor. One course. *Staff*

103X, 104X. Honors Intermediate Calculus and Linear Algebra. (QR) Similar to Mathematics 103, 104, but more theoretical. Students who have taken 32X are encouraged to enroll. Students continuing from 103X should take 104X rather than 104. One course each. *Staff*

104. Linear Algebra and Applications. (QR) Systems of linear equations and elementary row operations, Euclidean n -space and subspaces, linear transformations and matrix representations, Gram-Schmidt orthogonalization process, determinants, eigenvectors and eigenvalues; applications. Prerequisite: Mathematics 32 or 41. One course. *Staff*

111. Applied Mathematical Analysis I. (QR) First and second order differential equations with applications; matrices, eigenvalues, and eigenvectors; linear systems of differential equations; Fourier series and applications to partial differential equations. Intended primarily for engineering and science students with emphasis on problem solving. Not open to students who have had Mathematics 131. Prerequisite: Mathematics 103. One course. *Staff*

114. Applied Mathematical Analysis II. (QR) Boundary value problems, complex variables, Cauchy's theorem, residues, Fourier transform, applications to partial differ-

ential equations. Not open to students who have had Mathematics 181 or 230. Prerequisites: Mathematics 111 or 131, or 103 and consent of instructor. One course. *Staff*

120. Introduction to Theoretical Mathematics. (QR) Topics from set theory, number theory, algebra, and analysis. Recommended for prospective mathematics majors who feel the need to improve skills in logical reasoning and theorem-proving before taking Mathematics 121 and 139. Not open to students who have had Mathematics 121, Mathematics 139, or equivalents. Prerequisite: Mathematics 103; corequisite: Mathematics 104. Half course. *Staff*

121. Introduction to Abstract Algebra. (QR) Groups, rings, and fields. Students intending to take a year of abstract algebra should take Mathematics 200 and 201. Not open to students who have had Mathematics 200. Prerequisite: Mathematics 104 or 111. One course. *Staff*

123S. Geometry. (QR) Euclidean geometry, inverse and projective geometries, topology (Möbius strips, Klein bottle, projective space), and non-Euclidean geometries in two and three dimensions; contributions of Euclid, Gauss, Lobachevsky, Bolyai, Riemann, and Hilbert. Prerequisite: Mathematics 32 or 41, or consent of instructor. One course. *Staff*

124. Combinatorics. (QR) Permutations and combinations, generating functions, recurrence relations; topics in enumeration theory, including the Principle of Inclusion-Exclusion and Polya Theory; topics in graph theory, including trees, circuits, and matrix representations; applications. Prerequisite: Mathematics 104 or consent of instructor. One course. *Staff*

126. Introduction to Linear Programming and Game Theory. (QR) Fundamental properties of linear programs; linear inequalities and convex sets; primal simplex method, duality; integer programming; two-person and matrix games. Prerequisite: Mathematics 104. One course. *Staff*

128. Number Theory. (QR) Divisibility properties of integers, prime numbers, congruences, quadratic reciprocity, number-theoretic functions, simple continued fractions, rational approximations; contributions of Fermat, Euler, and Gauss. Prerequisite: Mathematics 32 or 41, or consent of instructor. One course. *Staff*

128S. Number Theory. (QR) Same as Mathematics 128, but offered as a seminar. One course. *Staff*

131. Elementary Differential Equations. (QR) Solution of differential equations of elementary types; formation and integration of equations arising in applications. Not open to students who have had Mathematics 111. Prerequisite: Mathematics 103; corequisite: Mathematics 104. One course. *Staff*

132S. Qualitative Theory of Ordinary Differential Equations. (QR) Qualitative behavior of general systems of ordinary differential equations, with application to biological and ecological systems, oscillations in biochemistry, electrical networks, and the theory of deterministic epidemics. Prerequisite: Mathematics 131 or 111 or consent of instructor. One course. *Staff*

135. Probability. (QR) Probability models, random variables with discrete and continuous distributions. Independence, joint distributions, conditional distributions. Expectations, functions of random variables, central limit theorem. Prerequisite: Mathematics 103. C-L: Statistics 104. One course. *Staff*

135S. Probability. (QR) Seminar version of Mathematics 135. In addition, each student will be required to do a project which illustrates the theory. Prerequisite: Mathematics 103. C-L: Statistics 104S. One course. *Staff*

136. Statistics. (QR) Sampling distributions, point and interval estimation, maximum likelihood estimators. Tests of hypotheses, the Neyman-Pearson theorem. Bayesian methods. Not open to students who have had Statistics 112 or 213. Prerequisites: Mathematics 104 and 135. C-L: Statistics 114. One course. *Staff*

139. Advanced Calculus I. (QR) Algebraic and topological structure of the real number system; rigorous development of one-variable calculus including continuous, differentiable, and Riemann integrable functions and the Fundamental Theorem of Calculus; uniform convergence of a sequence of functions; contributions of Newton, Leibniz, Cauchy, Riemann, and Weierstrass. Not open to students who have had Mathematics 203. Prerequisite: Mathematics 103. One course. *Staff*

149S. Problem Solving Seminar. (QR) Techniques for attacking and solving challenging mathematics problems and writing mathematical proofs. Course may be repeated. Consent of instructor required. Half course. *Staff*

150. Topics in Mathematics from a Historical Perspective. (QR) Content of course determined by instructor. Prerequisite: Mathematics 139 or 203 or consent of instructor. One course. *Staff*

150S. Topics in Mathematics from a Historical Perspective. (QR) Same as Mathematics 150, but offered as a seminar. One course. *Staff*

160. Mathematical Numerical Analysis. (QR) Zeros of functions; polynomial interpolation and splines; numerical integration and differentiation; applications to ordinary differential equations; numerical linear algebra; error analysis; extrapolation and acceleration. Not open to students who have had Computer Science 121 or 221. Satisfies the prerequisite for Computer Science 222 and 223. Prerequisites: Mathematics 103 and 104 and knowledge of an algorithmic programming language, or consent of instructor. One course. *Staff*

160S. Mathematical Numerical Analysis. (QR) Same as Mathematics 160, but offered as a seminar. One course. *Staff*

181. Complex Analysis. (QR) Complex numbers, analytic functions, complex integration, Taylor and Laurent series, theory of residues, argument maximum principles, conformal mapping. Not open to students who have had Mathematics 114 or 231. Prerequisite: Mathematics 139 or 203. One course. *Staff*

187. Introduction to Mathematical Logic. (QR) Propositional calculus; predicate calculus. Gödel completeness theorem, applications of number theory, incompleteness theorem, additional topics in proof theory or computability; contributions of Aristotle, Boole, Frege, Hilbert, and Gödel. Prerequisites: Mathematics 103 and 104 or Philosophy 103. One course. *Staff*

191, 192. Independent Study. Directed reading and research. Admission by consent of instructor and director of undergraduate studies. One course each. *Staff*

193, 194. Independent Study. Same as 191, 192, but for seniors. One course each. *Staff*

196S. Seminar in Mathematical Model Building. (QR) Real models, mathematical models, axiom systems as used in model building, deterministic and stochastic models, linear optimization, competition, graphs and networks, growth processes, evaluation of models. Term project: model of a nonmathematical problem. Prerequisites: Mathematics 103 and 104. One course. *Staff*

197S. Seminar in Mathematics. (QR) Intended primarily for juniors and seniors majoring in mathematics. Topics vary. Prerequisites: Mathematics 103 and 104. One course. *Staff*

198S, 199S. Honors Seminar in Mathematics. (QR) Topics vary. Consent of instructor and director of undergraduate studies required. One course each. *Staff*

For Seniors and Graduates

200. Introduction to Algebraic Structures I. (QR) Laws of composition, groups, rings; isomorphism theorems; axiomatic treatment of natural numbers; polynomial rings; division and Euclidean algorithms. Not open to students who have had Mathematics 121. Prerequisite: Mathematics 104 or equivalent. One course. *Staff*

201. Introduction to Algebraic Structures II. (QR) Vector spaces, matrices and linear transformations, fields, extensions of fields, construction of real numbers. Prerequisites: Mathematics 200, or Mathematics 121 and consent of instructor. One course. *Staff*

203. Basic Analysis I. (QR) Topology of R^n , continuous functions, uniform convergence, compactness, infinite series, theory of differentiation, and integration. Not open to students who have had Mathematics 139. Prerequisite: Mathematics 104. One course. *Staff*

204. Basic Analysis II. (QR) Inverse and implicit function theorems, differential forms, integrals on surfaces, Stokes' theorem. Not open to students who have had Mathematics 140. Prerequisites: Mathematics 203, or Mathematics 139 and consent of instructor. One course. *Staff*

205. Topology. (QR) Elementary topology, surfaces, covering spaces, Euler characteristic, fundamental group, homology theory, exact sequences. Prerequisite: Mathematics 104. One course. *Staff*

206. Differential Geometry. (QR) Geometry of curves and surfaces, the Serret-Frenet frame of a space curve, the Gauss curvature, Cadazzi-Mainardi equations, the Gauss-Bonnet formula. Prerequisite: Mathematics 104. One course. *Staff*

221. Numerical Analysis. (QR) Prerequisites: knowledge of an algorithmic programming language, intermediate calculus including some differential equations, and Mathematics 104. See C-L: Computer Science 250; also C-L: Statistics 273. One course. *Gardner, Greenside, or Rose*

222. Numerical Differential Equations. (QR) Prerequisite: Computer Science 221 or 250. See C-L: Computer Science 252. One course. *Gardner, Greenside, or Rose*

223. Numerical Linear Algebra. (QR) Prerequisite: Computer Science 221 or 250 or equivalent. See C-L: Computer Science 254. One course. *Rose*

230. Mathematical Methods in Physics and Engineering I. (QR) Heat and wave equations, initial and boundary value problems, Fourier series, Fourier transforms, potential theory. Not open to students who have had Mathematics 114. Prerequisites: Mathematics 103 and 104 or equivalents. One course. *Staff*

231. Mathematical Methods in Physics and Engineering II. (QR) Green's functions, partial differential equations in several space dimensions. Complex variables, analytic functions, Cauchy's theorem, residues, contour integrals. Other topics may include method of characteristics, perturbation theory, calculus of variations, or stability of equilibria. Prerequisite: Mathematics 114 or 230. One course. *Staff*

233. Asymptotic and Perturbation Methods. (QR) Asymptotic solution of linear and nonlinear ordinary and partial differential equations. Asymptotic evaluation of integrals. Singular perturbation. Boundary layer theory. Multiple scale analysis. Prerequisite: Mathematics 114 or equivalent. One course. *Staff*

238, 239. Topics in Applied Mathematics. (QR) Conceptual basis of applied mathematics, combinatorics, graph theory, game theory, mathematical programming, or numerical solution of ordinary and partial differential equations. Prerequisites: Mathematics 103 and 104 or equivalents. One course each. *Staff*

240. Applied Stochastic Processes. (QR) An introduction to stochastic processes without measure theory. Topics selected from: Markov chains in discrete and continuous time, queueing theory, branching processes, martingales, Brownian motion, stochastic calculus. Prerequisite: Mathematics 135 or equivalent. C-L: Statistics 253. One course. *Staff*

241. Linear Models. (QR) Prerequisites: Mathematics 104 and Statistics 113 or 210. See C-L: Statistics 244. One course. *Staff*

242. Introduction to Multivariate Statistics. (QR) Prerequisite: Statistics 244 or equivalent. See C-L: Statistics 245. One course. *Burdick*

245. Functional Analysis for Scientific Computing. (QR) Prerequisite: Computer Science 221 or 250. See C-L: Computer Science 256. One course. *Rose*

260. Groups, Rings, and Fields. (QR) Groups including nilpotent and solvable groups, p-groups and Sylow theorems; rings and modules including classification of modules over a PID and applications to linear algebra; fields including extensions and Galois theory. Prerequisite: Mathematics 201 or equivalent. One course. *Staff*

261. Commutative Algebra. (QR) Extension and contraction of ideals, modules of fractions, primary decomposition, integral dependence, chain conditions, affine algebraic varieties, Dedekind domains, completions. Prerequisite: Mathematics 260 or equivalent. One course. *Staff*

271. Algebraic Topology. (QR) Fundamental group and covering spaces, homology groups of cell complexes, classification of compact surfaces, the cohomology ring and Poincaré duality for manifolds. Prerequisites: Mathematics 171S and 200 or equivalents. One course. *Staff*

273. Algebraic Geometry. (QR) Local theory: affine varieties, algebraic and topological theory of singularities. Global theory over the complex numbers: Riemann surfaces, Jacobians, Kähler manifolds, Hodge theory, theorems of Lefschetz and Kodaira. Prerequisite: Mathematics 261 or equivalent. One course. *Staff*

275. Differential Geometry. (QR) Differentiable manifolds, fiber bundles, connections, curvature, characteristic classes, Riemannian geometry including submanifolds and variations of the length integral, complex manifolds, homogeneous spaces. Prerequisites: Mathematics 204 and 260 or equivalents. One course. *Staff*

276. Topics in Differential Geometry. (QR) Lie groups and related topics, Hodge theory, index theory, minimal surfaces, Yang-Mills fields, exterior differential systems, several complex variables. Prerequisite: Mathematics 275 or consent of instructor. One course. *Staff*

277. Topics in Algebraic Geometry. (QR) Projective varieties and the theory of extremal rays, classification of surfaces and higher-dimensional varieties, variation of Hodge structure and moduli problems, schemes and arithmetic varieties, or other advanced topics. Prerequisite: Mathematics 273 or consent of instructor. One course. *Staff*

278, 279. Topics in Topology. (QR) Point set, algebraic, geometric, or differential topology. Consent of instructor required. One course each. *Staff*

281. Real Analysis I. (QR) Measures; Lebesgue integral; L^p spaces; Daniell integral, differentiation theory, product measures. Prerequisite: Mathematics 204 or equivalent. One course. *Staff*

282. Real Analysis II. (QR) Metric spaces, fixed point theorems, Baire category theorem, Banach spaces, fundamental theorems of functional analysis, Fourier transform. Prerequisite: Mathematics 281 or equivalent. One course. *Staff*

285. Complex Analysis. (QR) Complex calculus, conformal mapping, Riemann mapping theorem, Riemann surfaces. Prerequisite: Mathematics 204 or equivalent. One course. *Staff*

286. Topics in Complex Analysis. (QR) Geometric function theory, function algebras, several complex variables, uniformization, or analytic number theory. Prerequisite: Mathematics 285 or equivalent. One course. *Staff*

290. Probability. (QR) Random variables, independence, expectations, laws of large numbers, central limit theorem, Markoff chains. Prerequisite: Mathematics 281 or equivalent. C-L: Statistics 207. One course. *Staff*

293. Topics in Probability Theory. (QR) Brownian motion, diffusion processes, random walks, and applications to differential equations and mathematical physics. Prerequisite: Mathematics 290 or consent of instructor. C-L: Statistics 297. One course. *Staff*

296. Ordinary Differential Equations. (QR) Existence and uniqueness theorems for nonlinear systems, well-posedness, two-point boundary value problems, phase plane diagrams, stability, dynamical systems, and strange attractors. Prerequisites: Mathematics 104, 111 or 131, and 203 or 139. One course. *Staff*

297. Partial Differential Equations I. (QR) Fundamental solutions of linear partial differential equations, hyperbolic equations, characteristics, Cauchy-Kowalevski theorem, propagation of singularities. Prerequisite: Mathematics 204 or equivalent. One course. *Staff*

298. Partial Differential Equations II. (QR) Elliptic boundary value problems, regularity theorems, the diffusion equation, and nonlinear equations. Prerequisite: Mathematics 297 or equivalent. One course. *Staff*

299. Topics in Partial Differential Equations. (QR) Hyperbolic conservation laws, pseudo-differential operators, variational inequalities, theoretical continuum mechanics. Prerequisite: Mathematics 298 or equivalent. One course. *Staff*

COURSES CURRENTLY UNSCHEDULED

31X. Introductory Honors Calculus I. (QR)

33, 34. Introductory Calculus with Digital Computation. (QR)

71S. Special Topics in Mathematics: For First- and Second-Year Students. (QR)

72S. Special Topics in Mathematics: For First- and Second-Year Students. (QR)

106. Linear Algebra with Digital Computation. (QR)

140. Advanced Calculus II. (QR)

140S. Advanced Calculus II. (QR)

171S. Elementary Topology. (QR)

- 234. Mathematics for Quantum Mechanics. (QR)
- 235. Topics in Mathematical Physics. (QR)
- 250. Introductory Mathematical Logic. (QR)
- 251. Set Theory I. (QR)
- 252. Set Theory II. (QR)
- 253. Recursion Theory
- 258, 259. Topics in Logic. (QR)
- 268. Topics in Algebra. (QR)
- 280. Differential Analysis. (QR)
- 283. Linear Operators. (QR)
- 284. Topics in Functional Analysis. (QR)
- 288, 289. Topics in Analysis. (QR)
- 294. Topics in Probability Theory. (QR)
- 295. Fourier Analysis and Distribution Theory. (QR)

THE MAJOR

The Department of Mathematics publishes a handbook to guide majors in selecting courses for various areas of interest. A copy may be obtained from the director of undergraduate studies.

For the A.B. Degree

Prerequisites: Mathematics 103 and 104 or the equivalent. (Many upper-level mathematics courses assume programming experience at the level of Computer Science 1. Students without computer experience are encouraged to take Computer Science 4.)

Major Requirements: Six courses in mathematics numbered above 111 including Mathematics 121 or 200 and Mathematics 139 or 203.

For the B.S. Degree

Prerequisites: Mathematics 103 and 104 or the equivalent. (Many upper-level mathematics courses assume programming experience at the level of Computer Science 1. Students without computer experience are encouraged to take Computer Science 4.)

Major Requirements: Eight courses in mathematics numbered above 111 including: Mathematics 121 or 200; Mathematics 139 or 203; and one of Mathematics 136, 181, 204, 205. Also, Physics 41L, 42L or Physics 51L, 52L or Physics 53L, 54L.

Honors/Distinction

The department offers a program for Latin honors by honors project. See the section on honors in this bulletin and also the *Handbook for Majors*.

Medicine (School)—Graduate (School) Basic Science Courses Open to Undergraduates

Qualified students in arts and sciences may select courses from the following offered by the graduate departments associated with the School of Medicine. A major is not

offered to undergraduates in any of the departments listed below; nor do the courses count toward area of knowledge requirements. For permission to register for these courses and for further information, see Professors Hsieh (biochemistry), Padilla (cell biology), Corley (immunology), Pickup (microbiology), W. C. Hall (neurobiology), Salvesen (pathology), or Schwartz (pharmacology). The 200-level courses below are described in the *Bulletin of Duke University: Graduate School*.

BIOCHEMISTRY (BCH)

- 209, 210. Independent Study. One or two courses. *Staff*
215. Genetic Mechanisms. Prerequisite: introductory biochemistry. C-L: The University Program in Genetics. One course. *Newins, Webster, and staff*
219. Molecular and Cellular Bases of Differentiation. C-L: Cell Biology 219, Immunology 219, Microbiology 219, and Pathology 219. One course. *Counce and staff*
222. Structure of Biological Macromolecules. Half course. *Richardson*
227. Introductory Biochemistry I. Prerequisite: organic chemistry. One course. *Hill, Greenleaf, and Rajagopalan*
228. Introductory Biochemistry II. Prerequisites: organic chemistry and Biochemistry 227. One course. *Fridovich and Webster*
259. Molecular Biology I: Proteins and Enzymes. C-L: Cell Biology 259, Immunology 259, Microbiology 259, and the University Program in Cell and Molecular Biology. One course. *Richardson and staff*
- 265S, 266S. Seminar. Topics and instructors announced each semester. Half course or variable. *Staff*
268. Molecular Biology II: Nucleic Acids. Prerequisites: introductory biochemistry and Biochemistry 259 or consent of instructor. C-L: Cell Biology 268, Immunology 268, Microbiology 268, the University Program in Cell and Molecular Biology, and the University Program in Genetics. One course. *Steege and staff*
291. Physical Biochemistry. Prerequisites: undergraduate physical chemistry and one year of calculus. One course. *Oas and staff*

Courses Currently Unscheduled

- 245L. Macromolecules, Ecology, and Evolution
- 276L. Comparative and Evolutionary Biochemistry

CELL BIOLOGY (CBI)

- All courses require the consent of the director of undergraduate studies.
202. Medical Physiology. Limited to students whose training requires knowledge of human physiology as it pertains to medicine. Four lectures, one conference, and one clinical correlation per week. Open to undergraduates only with consent of course leader. Students may take either 202 or 203-204, but not both, for credit. One course. *N. Anderson and staff*
203. Introduction to Physiology. Consent of instructor required. Students may take either 202 or 203-204, but not both, for credit. One course. *Blum and staff*
204. Cell and Molecular Physiology. (Continuation of 203.) Prerequisite: consent of instructor. One course. *Blum and staff*
205. Design and Analysis of Biological Experiments. One course. *Lobaugh*
208. Cellular Neurobiology. Consent of instructor required. C-L: Neurobiology 208. *Augustine, Kauer, and Wong*
210. Independent Study. Variable credit. *Staff*
211. Cellular Mechanisms of Injury. Prerequisite: consent of instructor. One course. *Staff*
212. Topics in Reproductive Biology. Prerequisite: Cell Biology 269 or equivalent. *N. Anderson, Saling, Schomberg, and Tyrey*
213. Oxygen and Physiological Function. Half course. *Jöbsis*
215. Seminar in the Physiology of Disease. Half course. *Mandel and guest faculty*
219. Molecular and Cellular Bases of Differentiation. C-L: Biochemistry 219, Immunology 219, Microbiology 219, and Pathology 219. One course. *Counce and staff*
223. Cellular and Integrative Cardiovascular Physiology and Biophysics. Consent of instructor required. Prerequisites: Cell Biology 203 or equivalent and Physics 52L or equivalent. C-L: Biomedical Engineering 223. One course. *Benjamin and staff*
232. Extracellular Matrix and Cell Adhesion. Half course. *Bennett and Erickson*
- 235, 235L. Advanced Research Training in Marine Molecular Biology and Biotechnology. Offered at Beaufort. One course, one and one half courses respectively. *C. Bonaventura and staff*
- 236S. Seminar on the Cellular and Molecular Biology of Skeletal Muscle. One course. *Schachat*
237. Analytical Imaging in Biomedical Research. One course. *Ingram, Kopf, and LeFurgey*
243. Environmental Biochemistry. Given at Beaufort. Prerequisite: organic chemistry. C-L: Environment 243. One course. *Bonaventura and Brouwer*
244. Cellular and Molecular Research Techniques. Given at Beaufort. Prerequisite: organic chemistry. C-L: Environment 244. One course. *Bonaventura and Brouwer*

259. Molecular Biology I: Proteins and Enzymes. Prerequisite: consent of instructor. C-L: Biochemistry 259, Immunology 259, Microbiology 259, and the University Program in Cell and Molecular Biology 259. One course. *Richardson and staff*

268. Molecular Biology II: Nucleic Acids. Prerequisites: introductory biochemistry and Cell Biology 259 or consent of instructor. C-L: Biochemistry 268, Immunology 268, Microbiology 268, the University Program in Cell and Molecular Biology, and the University Program in Genetics. One course. *Steege and staff*

269. Advanced Cell Biology. C-L: Biology 269 and the University Program in Cell and Molecular Biology 269. One course. *McClay and staff*

270S. Molecular and Cellular Adaptations of Marine Organisms. Given at Beaufort. Half course. *C. Bonaventura*

Courses Currently Unscheduled

217. Membrane Transport

IMMUNOLOGY (IMM)

214. Fundamentals of Electron Microscopy. Prerequisites: introductory biology and consent of instructor. C-L: Microbiology 214. One course. *Müller*

219. Molecular and Cellular Bases of Differentiation. C-L: Biochemistry 219, Cell Biology 219, Microbiology 219, and Pathology 219. One course. *Counce and staff*

244. Principles of Immunology. An introduction to the molecular and cellular basis of the immune response. Topics include anatomy of the lymphoid system, lymphocyte biology, antigen-antibody interactions, humoral and cellular effector mechanisms, and control of immune responses. Prerequisites: Biology 160 and Chemistry 152L and consent of instructor. C-L: Biology 244. One course. *Kostyu, McClay, and staff*

246S. Parasitic Diseases. Prerequisites: Immunology 244 or 291, and Biochemistry 227 or equivalent. C-L: Microbiology 246S. One course. *Balber*

259. Molecular Biology I: Proteins and Enzymes. C-L: Biochemistry 259, Cell Biology 259, Microbiology 259, and the University Program in Cell and Molecular Biology 259. One course. *Richardson and staff*

268. Molecular Biology II: Nucleic Acids. Prerequisites: introductory biochemistry and Biochemistry 259 or consent of instructor. C-L: Biochemistry 268, Cell Biology 268, Microbiology 268, the University Program in Cell and Molecular Biology and the University Program in Genetics. One course. *Steege and staff*

269. Advanced Cell Biology. Prerequisite: introductory cell biology or consent of instructor. C-L: Biology 269, Cell Biology 269, Microbiology 269, and the University Program in Cell and Molecular Biology 269. One course. *McClay and staff*

MICROBIOLOGY (MIC)

209, 210. Independent Study. A laboratory or library project. Prerequisite: consent of director of undergraduate studies and instructor. Credit to be arranged. *Staff*

214. Fundamentals of Electron Microscopy. Prerequisites: introductory biology and consent of instructor. One course. *Müller*

219. Molecular and Cellular Bases of Differentiation. C-L: Biochemistry 219, Cell Biology 219, Immunology 219, and Pathology 219. One course. *Counce and staff*

221, 221L. Medical Microbiology. Prerequisite: consent of instructor. One course, one and one half courses respectively. *Mitchell and staff*

259. Molecular Biology I: Proteins and Enzymes. C-L: Biochemistry 259, Cell Biology 259, Immunology 259, and the University Program in Cell and Molecular Biology 259. One course. *Richardson and staff*

268. Molecular Biology II: Nucleic Acids. Prerequisites: introductory biochemistry and Biochemistry 259 or consent of instructor. C-L: Biochemistry 268, Cell Biology 268, Immunology 268, the University Program in Cell and Molecular Biology, and the University Program in Genetics. One course. *Steege and staff*

269. Advanced Cell Biology. Prerequisite: introductory cell biology or consent of instructor. C-L: Biology 269, Cell Biology 269, Immunology 269, and the University Program in Cell and Molecular Biology 269. One course. *McClay and staff*

Courses Currently Unscheduled

246S. Parasitic Diseases

NEUROBIOLOGY (NBI)

189S. Building the Brain. Open only to juniors and seniors. See C-L: Distinguished Professor Course 189S; also C-L: Human Development, Neurosciences, and Psychology 189S. One course. *Purves*

208. Cellular Neurobiology. Consent of instructor required. C-L: Cell Biology 208. One course. *Augustine, Kauer, Lo, and Reinhart*

209. Systems Neurobiology. Prerequisite: consent of instructor. One course. *Cant and Fitzpatrick*

211. Developmental Neurobiology. Consent of instructor required. One course. *Katz and Purves*

212. Molecular Neurobiology. Consent of instructor required. One course. *La Mantia, Lo, Matthew, and Skene*
214. The Neural Basis for Sensory-Motor Integration. Consent of instructor required. One course. *Diamond and W. C. Hall*

Courses Currently Unscheduled

- 266S. Comparative Neurobiology

PATHOLOGY (PTH)

All courses require consent of instructor and director of graduate studies.

- 209, 210. Independent study. Prerequisite: senior standing. Credit to be arranged. *Staff*
219. Molecular and Cellular Bases of Differentiation. C-L: Biochemistry 219, Cell Biology 219, Immunology 219, and Microbiology 219. One course. *Counce and staff*
258. Cellular and Subcellular Pathology. Half course. *Shelburne and Sommer*
275. Fundamentals of Electron Microscopy and Biological Microanalysis. One course. *Brody, Ingram, Shelburne, and Sommer*

PHARMACOLOGY (PHR)

150. Pharmacology: Drug Actions and Reactions. Mechanisms of drug action, concepts of drug toxicity, resistance, tolerance and drug interactions. Examples of how drugs affect the autonomic and central nervous systems, the cardiovascular and endocrine systems, and how drugs treat infection and cancer. Prerequisites: introductory biology (Biology 21L, 22L) and chemistry (Chemistry 11L, 12L). One course. *Schwartz*

160. Drugs, Brain, and Behavior. Mechanisms by which psychoactive drugs act. Changes which occur with chronic use of drugs; drug abuse and dependence. Social and legal implications of psychoactive drugs. Prerequisites: introductory biology (Biology 21L, 22L) and chemistry (Chemistry 11L, 12L). C-L: Psychology 127. One course. *Kuhn*

191, 192. Independent Study. For juniors and seniors with consent of director of undergraduate studies and supervising instructor. Variable credit. *Staff*

233. Essentials of Pharmacology. Prerequisites: introductory biology; Chemistry 151L; Mathematics 31, 32, and consent of instructor. One course. *Slotkin and staff*

254. Mammalian Toxicology. Prerequisites: introductory biology and Chemistry 151L, or consent of instructor. One course. *Abou-Donia and staff*

Medieval and Renaissance Studies Program (MED)

Professor Witt, *Chair*; Assistant Professor Rasmussen, *Director of Undergraduate Studies*

A major is available in this program.

The program in Medieval and Renaissance Studies is designed to provide the student with a well-rounded understanding of the historical, cultural, and social forces that shaped the medieval and Renaissance periods. The program is divided into four areas of study: fine arts (art and musicology); history; language and literature (English, French, German, Greek, Italian, Latin, and Spanish); and philosophy-religion. An interdisciplinary major is offered. See the section on the major below.

MEDIEVAL AND RENAISSANCE COURSES

21S. First-Year Seminar: Topics in Medieval Studies. Topics vary according to instructor: perspectives from history, literature, religion, philosophy, and the arts. One course. *Staff*

22S. First-Year Seminar: Topics in Renaissance Studies. Topics vary according to instructor: perspectives from history, literature, religion, philosophy, and the arts. One course. *Staff*

114. Aspects of Medieval Culture. (CZ) A study of historical, literary, philosophical, and art historical materials introducing medieval culture and the methods developed for its study. C-L: Art 139, Classical Studies 139, and History 116. One course. *Rasmussen, Tronzo, and Witt*

115. Aspects of Renaissance Culture. (CZ) A study of historical, literary, philosophical, and art historical materials introducing Renaissance culture and the methods developed for its study. C-L: Art 149 and History 148. One course. *Rasmussen, Van Miegroet, and Witt*

160S. Topics in Medieval and Renaissance Studies. Interdisciplinary perspectives from the arts, history, literature, philosophy, and religion. For juniors and seniors and medieval and renaissance studies majors, or with consent of instructor. Prerequisite: one course in medieval and/or Renaissance periods. One course. *Staff*

200S. Seminar in Medieval and Renaissance Studies. (CZ) Topics in the historiography and interpretation of medieval and Renaissance culture. Topics will vary from year to year. One course. *Staff*

OTHER COURSES AVAILABLE IN THE PROGRAM AND DESCRIBED UNDER THE LISTINGS OF THE DEPARTMENTS SPECIFIED BELOW

Art and Art History

- 129. The History of Prints and Printmaking. *Rice*
- 131. Art of the Early Middle Ages. *Tronzo or Wharton*
- 134. Topics in Medieval Art and Architecture. *Tronzo*
- 140. Topics in Renaissance Art. *Rice*
- 141. Fifteenth-Century Italian Art. *Rice*
- 142. Sixteenth-Century Italian Art. *Rice*
- 145. Renaissance Art in Florence. *Rice*
- 146. Italian Renaissance Architecture. *Rice*
- 148. Art of the Netherlands in the Fifteenth Century. *Van Miegroet*
- 150/250. Italian Baroque Architecture. *Rice*
- 152. Art of the Netherlands in the Sixteenth Century. *Van Miegroet*
- 153. Art of the Northern Netherlands in the Seventeenth Century. *Van Miegroet*
- 154. German Art in the Fifteenth and Sixteenth Centuries. *Van Miegroet*
- 156. Art of the Southern Netherlands in the Seventeenth Century. *Van Miegroet*
- 216. The Art of the Counter-Reformation. *Rice*
- 233S. Topics in Early Christian and Byzantine Art. *Wharton*
- 236S. Topics in Romanesque and Gothic Art and Architecture. *Staff*
- 243S. Topics in Netherlandish and German Art. *Van Miegroet*
- 247S. Topics in Italian Renaissance Art. *Rice*
- 260S. Topics in Italian Baroque Art. *Rice*

Classical Studies

- 117. Ancient Myth in Literature. *Newton*

English

- 113A. Introduction to Old English. *Staff*
- 113B. Old English Literature. *Staff*
- 121. Medieval English Literature to 1500. *Staff*
- 122. Sixteenth-Century English Literature. *DeNeef, Fish, Randall, or Schwartz*
- 123. English Literature: 1600 to 1660. *DeNeef, Fish, Randall, or Schwartz*
- 140, 141. Chaucer. *DeNeef or Gopen*
- 143, 144. Shakespeare. *DeNeef, Gopen, Jones, Porter, Randall, or Valbuena*
- 145. Milton. *Fish, Price, or Schwartz*
- 207A. Introduction to Old English. *Staff*
- 207B. Old English Literature. *Staff*
- 208. History of the English Language. *Butters or J. Tetel*
- 212. Middle English Literature: 1100 to 1500. *Staff*
- 213, 214. Chaucer. *Staff*
- 221. Renaissance Prose and Poetry: 1500 to 1660. *DeNeef, Fish, Randall, or Schwartz*
- 225. Renaissance Drama: 1500 to 1642. *Randall*

French

- 145S. Topics in Renaissance Literature and Culture. *M. Tetel*
- 146S. Montaigne and Self-Portraiture. *M. Tetel*
- 148. French Drama of the Seventeenth Century. *Longino*
- 211. History of the French Language. *Thomas*

German

- 201. Introduction to Middle High German. *Rasmussen*
- 202S. Medieval Seminar. *Rasmussen*
- 203S. Sex, Gender, and Love in Middle High German Literature. *Rasmussen*
- 210S. Renaissance and Reformation. *Borchardt*
- 260. History of the German Language. *Rasmussen*

History

- 107A, 107B. History of England. *Cell or Herrup*
- 116. Aspects of Medieval Culture. *Solterer, Tronzo, and Witt*
- 117. Early Modern Europe. *Neuschel*
- 133. Medieval Europe, 300-1400. *Staff*
- 138. Renaissance and Reformation Germany. *Robisheaux*
- 151A. The Intellectual Life of Europe, 1250-1600. *Witt*
- 173. History of Spain from Late Medieval Times to the Present. *TePaske*
- 174A. History of Colonial Hispanic America from Pre-Columbian Times to the Wars of Independence. *TePaske*
- 195S.13, 196S.13. Problems in Early Modern English History. *Herrup*
- 195S.37. Before Columbus: Western Views of the Non-Western World. *Green*
- 196S.41. Women in Medieval Society. *Green*
- 221. Topics in the Social and Economic History of Europe, 1200-1700. *Staff*
- 222. Problems in the Intellectual History of the European Renaissance and Reformation. *Witt*
- 237S. Europe in the Early Middle Ages. *Staff*
- 238S. Europe in the High Middle Ages. *Staff*
- 267S. England in the Sixteenth Century. *Herrup*
- 268S. England in the Seventeenth Century. *Herrup*

Italian

- 101. Introduction to Italian Literature. *Caserta or Finucci*
- 145S. Topics in Renaissance Literature and Culture. *Finucci*
- 284, 285. Dante. *Caserta*

Latin

- 221. Medieval Latin. *Newton*
- Students interested in Latin paleography should consult the director of undergraduate studies in the program.

Music

- 155S. Music History I: Antiquity, Middle Ages, Early Renaissance. *Brothers*
- 156S. Music History II: Late Renaissance, Baroque. *Bartlet, Brothers, Meniker, or Silbiger*
- 211. Notation. *Brothers or Williams*
- 222. Music in the Middle Ages. *Brothers*
- 223. Music in the Renaissance. *Brothers or Silbiger*
- 228-229. Collegium Musicum. *Brothers and Meniker*

Philosophy

- 119. Medieval Philosophy. *Mahoney*
- 120. Late Medieval and Renaissance Philosophy. *Mahoney*
- 218S. Medieval Philosophy. *Mahoney*
- 219S. Late Medieval and Renaissance Philosophy. *Mahoney*

Religion

- 134. Jewish Mysticism. *Bland*
- 162. Introduction to Islamic Civilization. *Lawrence and staff*

Spanish

- 151. Spanish Literature of the Renaissance and the Baroque. *Ross or staff*
- 210. History of the Spanish Language. *Garci-Gómez*

THE MAJOR

A major consists of at least eight courses drawn from the non-introductory courses of the four areas of study (art history, history, language and literature, and philosophy-religion). Three courses in each of two areas must be included. Besides the courses specifically listed (under Medieval and Renaissance Courses and departmental headings) in the medieval and Renaissance periods, provision may be made for independent study in any of the four areas.

Each program is tailored to the needs and interests of the student under the supervision of a committee consisting of faculty members from appropriate departments. After discussion with the director of undergraduate studies for medieval and Renaissance studies, the student submits a provisional program of study outlining special interdisciplinary interests. Normally the program is planned well before the end of the sophomore year to allow time to acquire a working knowledge of languages pertinent to specific interests.

Microbiology

For courses in Microbiology, see Medicine (School)—Graduate (School) Basic Science Courses Open to Undergraduates.

Military Science—Army ROTC (MSC)

Visiting Professor Guild, Lieutenant Colonel, U.S. Army, *Chair*; Visiting Assistant Professor Roller, Major, U.S. Army, *Director of Undergraduate Studies, Supervisor of Junior Instruction, and Commandant of Cadets*; Visiting Assistant Professor Green, Major, U.S. Army, *Supervisor of Senior Instruction*; Visiting Assistant Professor Case, Captain, U.S. Army, *Supervisor of Freshman Instruction and Recruiting Operations Officer*

The Department of Military Science offers students from all disciplines within the university the opportunity to study the following subjects: leadership (theory and practice), management (time, personnel, and materiel), ethics and the military profession, the role and responsibility of the military in a democratic society, the philosophy and practice of military law, and strategy and tactics.

The Army ROTC program is made up of a two-year basic course of study (freshman and sophomore level) which is taken without obligation by nonscholarship students, and a two-year advanced course of study (junior and senior level) which includes a six-week advanced camp, usually completed during the summer prior to the senior year. Direct entry into the advanced course is sometimes permitted if an applicant has previous military training or experience, or when a six-week basic camp is completed. To be eligible for participation in the advanced course, students must successfully complete the basic course (unless direct entry is permitted), be physically qualified, be of good moral character, have a minimum of two years remaining as a student (undergraduate or graduate level, or a combination), and sign a contract to accept a commission in the United States Army, the Army National Guard, or the Army Reserve as directed by the Secretary of the Army.

Laboratory is mandatory each semester for scholarship cadets and nonscholarship cadets. Some specific laboratories are required for non-ROTC students taking Military Science 51, 52, and 113. Students should consult the Department of Military Science (telephone 1-919-660-3090 collect, or 1-800-222-9184, toll free) for more detailed information. Also see the Army Reserve Officers' Training Corps section under Special Programs in this bulletin.

1L. Fall Semester Laboratory. Drill and ceremonies, marksmanship training, land navigation exercises, first aid, small unit tactics, and confidence course training. Must be repeated with each course. No credit. *Roller*

2L. Spring Semester Laboratory. Drill and ceremonies, communications, and tactical exercises. Must be repeated with each course. No credit. *Roller*

11. Introduction to ROTC and the Army. The military organization with emphasis on tradition, doctrine, and contribution to national objectives. Laboratory required for ROTC cadets. Half course. *Case*

12. The Military Profession. Introduction to the concept of the military as a profession. Questions of ethics and values in the military; the issue of war and morality. Laboratory required for ROTC cadets. Half course. *Case*

51. Military Topography. Interpretation and use of topographical maps to facilitate land navigation. Consideration of the military significance of terrain. Laboratory required for Army ROTC cadets. Half course. *Roller*

52. Introduction to Small Unit Tactics. Introduction to planning, organizing, and conducting small unit offensive and defensive operations. Consideration of the principles of war. Laboratory required for Army ROTC cadets. Half course. *Roller*

113. Advanced Military Operations. Fundamentals of the conduct of military operations including advanced military topography; unit movements; route planning; nuclear, biological, and chemical defense; and military communications. Laboratory required for Army ROTC cadets. Prerequisites: Military Science 51 and 52 or ROTC Basic Camp. One course. *Roller*

114. Advanced Tactical Applications. Study of threat forces to include doctrine, organization, equipment, and training. Conduct of platoon offensive, defensive, and patrolling operations for Army infantry units. Laboratory required for Army ROTC cadets. Prerequisite: Military Science 113. One course. *Roller*

151S. Military Justice and Law of War. Introduction to the Uniform Code of Military Justice, selected topics in military law, the law of land warfare, and war and morality. An analysis of the relationship of leadership to these topics. Laboratory required for Army ROTC cadets. One course. *Green*

152. Leadership and Command Management. Theory and practice of leadership and military management techniques for mission accomplishment. Laboratory required for Army ROTC cadets. One course. *Green*

191. Independent Study. Directed readings and research in military science. One course. *Staff*

Music (MUS)

Associate Professor Jaffe, *Chair*; Associate Professor Bartlet, *Director of Undergraduate Studies*; Professors Silbiger, Todd, and Williams; Associate Professor Gilliam; Assistant Professors Brothers, Henry, and Lindroth; Associate Professors of the Practice Jeffrey, Parkins, Szász, and Wynkoop; Assistant Professors of the Practice Love, Muti, Troxler, and Votta; Adjunct Assistant Professor Druessedow; Lecturer Meniker; Artists-in-Residence Bagg, Berg, Ku, and Raimi; Staff Associates Crawford, Dimsdale, Eagle, Gilmore, Hanks, Hawkins, Jensen, Lail, Mizesko, Pederson, Schultz, and Tektonidis

A major is available in this department.

For over two thousand years, music has been viewed as a crucial part of education, compulsory in some cultures, optional in many, formative in all. Music is customarily regarded as an art, but as a university subject it has its own scientific language, logic, and grammar, in the understanding of which the mind is stretched and tested. Furthermore, music as taught at Duke includes assumptions that history, theory, composition, and performance are areas of comparable worth both in themselves and as a means of understanding the many facets of musicianship. Almost every student has some personal involvement with music (often with the many kinds of music), and the courses aim to further that involvement, whether passive or active, a simple hobby or a compelling force.

Courses include many kinds of instruction: applied lessons, history and theory lectures and seminars, harmony classes, composition seminars, ensemble participation, practical laboratory work (such as ear-training), coaching sessions for conductors and chamber musicians, and jazz improvisation. Emphasis is placed equally on theory and practice, and students' musical activity can vary widely across the spectrum from composing their own music to endeavoring to understand the technical, historical, and sociological context of other composers' music.

Musical studies can have a particular value in Program II. So many areas of interest in literature (English and world literature), the arts, art history, sociology, politics,

philosophy, religion, psychology, and physics are illustrated, paralleled, or elucidated by aspects of music, just as music itself is by those other disciplines.

THEORY, COMPOSITION, AND CONDUCTING

The department's theory courses are designed to give the student a deeper understanding of musical materials: harmony, counterpoint, voice leading, and musicianship. This is accomplished through analysis of repertoire, composition, aural work, and keyboard playing (score reading, figured bass, and simple improvisation).

36. Acoustics and Music. (NS) No previous knowledge of physics is assumed. See C-L: Physics 36. One course. *Lawson*

55. Introduction to Music Theory. (AL) Fundamentals of notation, melodic and harmonic practice, analysis, and score reading, as a basis for independent work. Does not count for major requirements. Prerequisite: some ability to read music. One course. *Troxler or staff*

56. The Songwriter's Vocabulary. (AL) Writing songs in various twentieth-century popular styles. Fundamentals of form, harmony, voice leading, text setting, and production. For nonmajors. Prerequisite: Music 55 or consent of instructor. One course. *Staff*

65. Fundamentals of Music Theory. (AL) Physical properties of sound, principles of diatonic tonal organization, melodic and harmonic constructions, elementary counterpoint, and figured bass. Laboratory. Prerequisites: basic knowledge of musical notation and vocabulary. One course. *Lindroth or Parkins*

66. Tonal Harmony. (AL) Harmonic language of eighteenth and nineteenth centuries, functional chromaticism, and introduction to musical forms. Laboratory. Prerequisite: Music 65. One course. *Lindroth*

67S. Composition I. (AL) Composing original music in smaller forms for voice, piano, and other instruments. Studies in compositional techniques. Prerequisites: Music 65 and 66 or consent of instructor. One course. *Jaffe or Lindroth*

68S. Composition II. (AL) See Music 67S. Prerequisites: Music 65 and 66 or consent of instructor. One course. *Jaffe or Lindroth*

75. Jazz Improvisation. (AL) The theory of jazz improvisation for all instruments and its practical application to the different styles of jazz. Consent of instructor required. Half course. *Jeffrey*

116S. Counterpoint. (AL) Polyphonic practice from the sixteenth through the twentieth centuries; sacred and secular music. Laboratory. Prerequisite: Music 66 or consent of instructor. One course. *Jaffe or Williams*

117S. Form, Analysis, and Compositional Techniques. (AL) Analytical studies and compositional exercises in various forms, techniques, and styles with an emphasis on nineteenth- and twentieth-century music. Laboratory. Prerequisite: Music 66 or consent of instructor. One course. *Jaffe or Lindroth*

123. Musicianship I. Development of practical musical skills: sight singing, ear training, and keyboard proficiency. Prerequisite: for music majors, Music 66; for nonmajors, consent of instructor. Half course. *Staff*

124. Musicianship II. Prerequisite: Music 123. Half course. *Parkins or staff*

128. Instrumental Conducting. (AL) Development of techniques of conducting instrumental ensembles with emphasis on orchestral repertoire. Score-reading and analysis, principles of interpretation, and practical conducting experience. Prerequisite: Music 66 or consent of instructor. One course. *Muti or Votta*

129. Choral Conducting. (AL) Development of techniques of conducting vocal repertoire, ranging from church anthems to large-scale works. Score-reading and analysis, principles of interpretation, and practical conducting experience. Prerequisite: Music 66 or consent of instructor. One course. *Wynkoop*

HISTORY, LITERATURE, AND MUSICOLOGY

The study of music history and literature contributes to a broader knowledge of culture and society. Courses offer students the opportunity to examine compositions in their historic and/or social context. In addition to surveying significant forms, genres, and styles, and their development, the courses include consideration of music's function, the place of musicians, aspects of performance practice, and aesthetic value. Although the normal prerequisite for Music 155S-158S (Music History I-IV) is Music 65, interested students in other disciplines with some background in music are encouraged to ask individual instructors for permission to enroll.

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

74. Introduction to Jazz. (AL) A survey examining musical, aesthetic, sociological, and historical aspects. For nonmajors. C-L: African and Afro-American Studies 74. One course. *Jeffrey*

119. The Humanities and Music. (AL) Study of music's relationship to the humanities (literature, art, philosophy, cultural and social history) through selected topics. Readings from primary sources, listening to representative pieces of music. Does not count for the major in music. C-L: Comparative Area Studies. One course. *Bartlet*

120S. Women in Music. (CZ) The lives and works of the principal women composers and musicians of Western art music from the Middle Ages to the present within their contemporary intellectual, artistic, sociological, and economic contexts. The extent to which gender as an historical variable affected their creative activities and achievements as well as the critical assessment of their canon. C-L: Comparative Area Studies and Women's Studies. One course. *Staff*

125. Masterworks of Music. (AL) An introduction to the lives and works of major Western composers. For nonmajors. One course. *Henry, Muti, Silbiger, Todd, or Votta*

125D. Masterworks of Music. (AL) Same as Music 125 except instruction is provided in two lectures and one small discussion meeting each week. One course. *Gilliam or Votta*

136S. Introduction to World Music. (CZ) Study of music in its cultural context through a survey of selected musical styles from Africa, Asia, and the Americas: musical systems and interrelationships between musicians and their societies. C-L: Comparative Area Studies. One course. *Staff*

140S. Ascendancy of the Jazz Solo. (AL) Development of the jazz solo from the 1920s through the 1940s. Examination of this music through listening and transcriptions. Prerequisites: ability to read music, and Music 74 or consent of instructor. C-L: African and Afro-American Studies 140S. One course. *Brothers*

141. Special Topics in Jazz. (AL) Topics vary. Also taught as African and Afro-American Studies 141. Prerequisite: Music 74 or consent of instructor. One course. *Brothers or Jeffrey*

143. Beethoven and His Time. (AL) The music of Beethoven and its relation to contemporary historical, social, and literary developments. Emphasis on the nine symphonies. C-L: Comparative Area Studies. One course. *Bartlet, Gilliam, Silbiger, or Todd*

144. Bach and His Time. (AL) The music of Johann Sebastian Bach and its historical and cultural background, with emphasis on the sacred and the instrumental works. Some consideration also given to the music of Bach's contemporaries, including Vivaldi, Rameau, and Handel. C-L: Comparative Area Studies. One course. *Meniker or Silbiger*

145. Mozart and His Time. (AL) A biographical sketch and a study of his works in their relationship to the past and to works of contemporaries in various European countries. C-L: Comparative Area Studies. One course. *Silbiger*

147. Verdi and Italian Romantic Opera. (AL) The operas of Giuseppe Verdi, from early works closely connected with the Risorgimento to later masterworks like *Otello*, considered in relation to his Italian predecessors and contemporaries. Includes the study of musical scores, dramatic aspects, and literary background, as well as artistic and social conventions. One course. *Muti*

155S. Music History I: Antiquity, Middle Ages, Early Renaissance. (AL) Prerequisite: for music majors, Music 65 or consent of instructor; for nonmajors, consent of instructor. C-L: Medieval and Renaissance Studies. One course. *Brothers*

156S. Music History II: Late Renaissance, Baroque. (AL) Prerequisite: for music majors, Music 65 or consent of instructor; for nonmajors, consent of instructor. C-L: Comparative Area Studies and Medieval and Renaissance Studies. One course. *Bartlet, Brothers, Meniker, or Silbiger*

157S. Music History III: Rococo and Classic. (AL) Prerequisite: for music majors, Music 65 or consent of instructor; for nonmajors, consent of instructor. C-L: Comparative Area Studies. One course. *Bartlet, Silbiger, or Todd*

158S. Music History IV: Romanticism and the Modern Period. (AL) Prerequisite: for music majors, Music 65 or consent of instructor; for nonmajors, consent of instructor. C-L: Comparative Area Studies. One course. *Bartlet, Gilliam, Silbiger, or Todd*

166. Opera. (AL) History of opera from the late sixteenth century to the present. Relationship of music and text; opera as social commentary; changing forms and styles. Selected composers, especially Mozart, Verdi, Puccini, and Wagner. One course. *Bartlet or Muti*

167. Symphonic Literature. (AL) An investigation of the symphony, tone poem, and symphonic suite from seventeenth-century antecedents to the orchestral repertoire of the present century. One course. *Henry*

168. Piano Music. (AL) The two-hundred-year tradition of music for the piano, the evolution of the instrument, and its principal composers (including Mozart, Beethoven, Chopin, Liszt, Brahms, and other major figures up to the present day). Performance traditions, the role of virtuosity, and improvisation. One course. *Todd*

169. Hollywood Film Music. (AL) Film scores from the 1930s to the present. Technical, structural, and aesthetic issues, as well as the problem of musical style. C-L: Film and Video. One course. *Gilliam*

185S, 186S. Seminar in Music. (AL) Primarily for junior and senior music majors. Topics to be announced. Consent of instructor required. One course each. *Staff*

187S, 188S. Seminar on Interpretation and Performance. (AL) Interpretative analysis of instrumental (piano, strings, winds) and vocal repertoire from baroque to modern composers. Participants expected to perform. Consent of instructor required. One course each. *Szász or staff*

For Advanced Undergraduates and Graduates

201. Introduction to Musicology. (AL) Methods of research on music and its history, including studies of musical and literary sources, iconography, performance practice, ethnomusicology, and historical analysis, with special attention to the interrelationships of these approaches. One course. *Druesedow*

203. Proseminar in Performance Practice. (AL) Critical methods in the study of historical performance practice, including the evaluation of evidence provided by musical and theoretical sources, archival and iconographic materials, instruments, and sound recordings. Current issues regarding the performance practice for music from the Middle Ages to the twentieth century. One course. *Meniker or Silbiger*

211, 212. Notation. (AL) Development and changing function of musical notation from c. 900 to c. 1900, including plainchant notations, black notations, white notations, the invention of printing (particularly movable type and engraving), keyboard and lute tablatures, scores. One course each. *Brothers or Williams*

213. Theories and Notation of Contemporary Music. (AL) The diverse languages of contemporary music and their roots in the early twentieth century, with emphasis on the problems and continuity of musical language. Recent composers and their stylistic progenitors: for example Ligeti, Bartók, and Berg; Carter, Schoenberg, Ives, and Copland; Crumb, Messiaen, and Webern; Cage, Varèse, Cowell, and Stockhausen. One course. *Jaffe or Lindroth*

215. Music Analysis. (AL) Historical, philosophical, and ideological issues raised by music analysis. Intensive study of harmony and voice leading in the works of major tonal composers, with emphasis on the analytic approach of Heinrich Schenker. One course. *Todd*

217. Selected Topics in Analysis. (AL) An exploration of analytical approaches appropriate to a diversity of music, which may include settings of literary texts, pre-tonal music, and music in oral and vernacular traditions. Prerequisite: Music 215 or consent of instructor. One course. *Silbiger*

218. Advanced Counterpoint. (AL) Selected topics in modal or tonal contrapuntal practice with emphasis on music writing up to five parts. Consent of instructor required for students not registered for doctoral work in composition. One course. *Jaffe, Lindroth, or Williams*

222. Music in the Middle Ages. (AL) Selected topics. C-L: Medieval and Renaissance Studies. One course. *Brothers*

223. Music in the Renaissance. (AL) Selected topics. C-L: Medieval and Renaissance Studies. One course. *Brothers or Silbiger*

224. Music in the Baroque Era. (AL) Selected topics. One course. *Meniker, Silbiger, or Williams*

225. Music in the Classic Era. (AL) Selected topics. One course. *Bartlet or Todd*

226. Music in the Nineteenth Century. (AL) Selected topics. One course. *Bartlet, Gilliam, or Todd*

227. Music in the Twentieth Century. (AL) Selected topics. One course. *Gilliam or Todd*

228-229. Collegium Musicum. An opportunity to study and perform vocal and instrumental music from the Middle Ages to the early romantic period. Weekly rehearsals and one or two concerts each semester. A written project required of all participants.

Consent of instructor required for all except graduate students in music. C-L: Medieval and Renaissance Studies. One course. *Brothers and Meniker*

228A-229A. Collegium Musicum. Same as 228-229, but no project required and no credit awarded. C-L: Medieval and Renaissance Studies. No credit. *Brothers and Meniker*

230. Workshop in Performance Practice. Laboratory for application of historically informed performance practice on instruments appropriate to the period of the music studied. Emphasizes instrumental and vocal chamber music. Open to graduates and undergraduates with consent of instructor. No credit. *Meniker*

236. Nineteenth-Century Piano Music. (AL) Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Liszt, and Brahms. The arts of improvisation and transcription, the keyboard virtuoso, the character piece, and the conflict between romantic content and form. One course. *Todd*

295S. Composition Seminar. (AL) Selected topics in composition. One course. *Jaffe or Lindroth*

296S. Analysis of Contemporary Music. (AL) Structures, expressive intentions, and functions since 1914. Contemporary orchestral music, American music, European music, popular media, musical tradition, and contemporary composers. Analysis of works performed in the department's Encounters Series with occasional guest composers present. One course. *Jaffe or Lindroth*

297, 298, 299. Composition. (AL) Weekly independent study sessions at an advanced level with a member of the graduate faculty in composition. One course each. *Jaffe or Lindroth*

INDEPENDENT STUDY

Admission to these courses will be subject to the approval of the director of undergraduate studies and the instructor. The instructor and course content will be established in accordance with the individual student's interests and capacities.

179, 180. Independent Study in Musical Performance.* Open only to sophomores possessing an exceptional technical and interpretative command of a musical medium. Requires either a half-length recital at the end of each semester of study or a full-length recital at the end of the second semester. In the latter case, a brief performance before a jury of music department faculty is required at the end of the first semester. Prerequisites: previous registration in private instruction in applied music at Duke, audition, and consent of instructor. One course each. *Staff*

181, 182. Independent Study in Musical Performance.* Same as 179, 180, but for juniors. One course each. *Staff*

183, 184. Independent Study in Musical Performance.* Same as 179, 180, but for seniors. One course each. *Staff*

191, 192. Independent Study. Directed reading, research, and/or theoretical analysis, culminating in a substantial paper; or exploration of advanced compositional techniques resulting in a work of larger scale. For juniors only. One course each. *Staff*

193, 194. Independent Study. Same as 191, 192, but for seniors. One course each. *Staff*

*The schedule of fees for private lessons is applicable to courses 179, 180, 181, 182, 183, 184 (see subsection on fees).

APPLIED MUSIC

In conjunction with theory and history, performance is an active way of understanding music literature, facing questions of style, and honing one's technical and expressive skills. Provided they qualify by audition, students are encouraged to enroll in private instruction and to participate in ensembles. Auditions must be arranged with the instructor prior to registration. Enrollment in an applied music course does not guarantee permission to enroll in the instructor's class or ensemble the following semester; in some cases another audition may be required. For those students who wish to study privately but do not qualify for university-level instruction, a list of music teachers in the immediate area who are available to Duke students can be obtained from the department office. All applied music courses may be repeated for credit, but no more than two ensembles may be taken concurrently.

57S, 58S. Vocal Diction. 57S: Italian/English; 58S: German/French. For singers, actors, radio announcers, and public speakers. Introduction to the international phonetic alphabet. Students will be required to sing in class. Written, oral, and vocal performance examinations. Half course each. *Lail*

Instruction: half hour

- 79. Class Voice. Quarter course. *Staff*
- 80. Piano. Quarter course. *Crawford, Hawkins, Love, or Szász*
- 81. Strings. Quarter course. *Bagg, Berg, Ku, or Raimi*
- 82. Woodwinds. Quarter course. *Gilmore, Jeffrey, Pederson, Schultz, or Troxler*
- 83. Brass. Quarter course. *Dimsdale, Eagle, or Mizesko*
- 84. Percussion. Quarter course. *Hanks*
- 85. Voice. Quarter course. *Jensen, Lail, or Tektonidis*
- 86. Organ. Quarter course. *Parkins*
- 87. Harpsichord. Quarter course. *Meniker*

Instruction: 1 hour

- 90. Piano. Half course. *Crawford, Hawkins, Love, or Szász*
- 91. Strings. Half course. *Bagg, Berg, Ku, or Raimi*
- 92. Woodwinds. Half course. *Gilmore, Jeffrey, Pederson, Schultz, or Troxler*
- 93. Brass. Half course. *Dimsdale, Eagle, or Mizesko*
- 94. Percussion. Half course. *Hanks*
- 95. Voice. Half course. *Jensen, Lail, or Tektonidis*
- 96. Organ. Half course. *Parkins*
- 97. Harpsichord. Half course. *Meniker*

Ensemble Classes: pass/fail

- 100. Symphony Orchestra. Quarter course. *Muti*
- 101. Wind Symphony. Quarter course. *Votta*
- 102. Marching Band. Quarter course. *Boumpani*
- 103. Jazz Ensemble. Quarter course. *Jeffrey*
- 104. Small Jazz Ensemble. Quarter course. *Jeffrey*
- 106. Chamber Music. Quarter course. *Hawkins*
- 111. Opera Workshop. Quarter course. *Lail*
- 112. Chapel Choir. Quarter course. *Wynkoop*
- 113. Chorale. Quarter course. *Wynkoop*

Credit in Applied Music. (Skills courses—credit not applicable to area of knowledge requirements.) Credit for instruction in courses below 100 is granted on the basis of a half course per semester for one hour of private instruction per week and a minimum of six hours practice weekly; or a half course per year for one half hour of private instruction or one period of class study and a minimum of six hours practice per week. An additional weekly class meeting for performance and criticism may be required by the instructor without additional credit.

Fees. Applied music instruction in one medium (instrument or voice) is offered free to music majors. There is a fee for additional instruction for music majors and all instruction for nonmajors. For specific information on those fees (for one-hour and half-hour private lessons and half-hour class lessons) consult the Office of the Bursar.

Fees are not refundable after the final drop/add day.

No charge is made for practice room facilities for students registered for private or class lessons in applied music. A fee schedule for the use of facilities by others not registered for applied lessons is available from the music department office.

See also Institute of the Arts in this bulletin.

COURSES CURRENTLY UNSCHEDULED

77. Introduction to Chamber Music. (AL)

115S. Modal Counterpoint. (AL)

122. Orchestration. (AL)

135S. American Music to 1900. (AL)

138. Music in East and Southeast Asia. (AL)

139. Twentieth-Century Music. (AL)

146. Mendelssohn and Schumann. (AL)

165. Opera in Vienna. (AL)

171S. Bach: Master of Style. (AL)

172S. Handel and Bach: Music for Voice. (AL)

THE MAJOR

A major or second major in music is a means of preparing students for further professional training in the branches of the art, for graduate study as historians, composers, and performers, and for a more intimate understanding of one of life's most important experiences. The music major can also be an attractive pursuit for the well-rounded undergraduate planning a career in another field, such as business, law, or medicine. The aim of the required courses is to give a balanced selection of history, theory, composition, and performance, reinforced by constant attention to the art of listening. With the required courses as their foundation, students choose electives to further their interest in, or gifts for, a particular music activity, so that a performer will have a good theoretical background, a historian considerable experience as a player, a composer various kinds of understanding of music of the past, and so on.

Prerequisites. Music 65, 66, and one year of applied music study in an instrument or voice; two semesters of participation in a departmental ensemble (excluding Music 102), with or without credit.

Major Requirements. Music 116S, 117S, 123 and 124 (two half courses), 155S-158S, and one additional elective course in the department. Those who plan to study music beyond the undergraduate level are strongly advised to prepare themselves in two or more foreign languages.

Honors/Distinction. Music majors who are qualified (see the section on honors in this bulletin) may undertake work leading to departmental graduation with distinction or Latin honors by honors project. In either case the candidate must make application to the Director of Undergraduate Studies by March 20 of the junior year. The project is normally a year-long endeavor involving an independent study or an appropriate graduate seminar each semester of the senior year. It must culminate in a substantial paper (historical, analytical, or theoretical), which may be more concise if offered in conjunction with a recital or a composition. The final project must be approved by a faculty committee.

Naval Science—Navy ROTC (NS)

Professor Avery, Captain, U.S. Navy, *Chair*; Visiting Assistant Professor Hamlin, Major, U.S. Marine Corps, *Director of Undergraduate Studies*; Visiting Associate Professor Kaufman, Commander, U.S. Navy; Visiting Assistant Professors Zielinski, Lieutenant, U.S. Navy, Raup, Lieutenant, U.S. Navy, and McClenney, Lieutenant, U.S. Navy

Courses in naval science are open to all students. The program in naval science offers students an opportunity to gain a broad-based knowledge in naval studies leading to a challenging career as a naval or marine corps officer. Since a major is not available in this program, scholarship program participants are encouraged to pursue majors in technical fields, although a major in any field of study leading to a baccalaureate degree meets the basic requirement. The academic program for an approved degree and commission must include all naval science courses and laboratories. Navy option scholarship students must complete one year of calculus by the end of the sophomore year, one year of calculus-based physics by the end of the junior year, one year of American military history or national security policy, one year of English, and one semester of computer science.

Nonscholarship Navy option student requirements are one year of mathematics, one year of physical science, one year of English, and one semester of computer science. Marine Corps option students are required to take one year of American military history or national security policy and, if on scholarship, one semester of a foreign language.

11. Naval Orientation. Organization, missions, and branches of specialization within the United States Navy. Customs, traditions, leadership, and career opportunities. No credit. *Zielinski*

11L. Naval Orientation Laboratory. Practical application of the elements and material presented in Naval Science 11. No credit. *Zielinski*

12. Naval Ships Systems. Quantitative study of basic naval ships' systems. Focus on propulsion and various auxiliary systems. Ship design, stability, and damage control. One course. *Zielinski*

12L. Naval Ships Systems Laboratory. Practical application of the theories and principles of naval ships systems. No credit. *Zielinski*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

52. Seapower and Maritime Affairs. The role of seapower in national and foreign policy, and as an instrument of politico-military strategy. Includes comparative study of United States and Soviet maritime strategies. One course. *McClenney*

53L. Seapower Laboratory. Case studies and contemporary issues dealing with United States Navy. Mandatory for Navy ROTC midshipmen. No credit. *McClenney*

126. Concepts and Analyses of Naval Tactical Systems. Detection systems; systems integration into current naval platforms and their offensive and defensive capabilities. One course. *Zielinski*

126L. Naval Tactical Systems Laboratory. Practical application of the theories and principles of naval tactical systems. No credit. *Zielinski*

131. Navigation. Theory, principles, and procedures of ship navigation, movements, and employment. Dead reckoning, piloting, celestial and electronic principles of navigation. Naval Science 131L should be taken concurrently. One course. *Palm*

131L. Navigation Laboratory. Practical application of the theories and principles of navigation as presented in the lecture series. No credit. *Raup*

132. Naval Operations. Components of general naval operations, including concepts and application of tactical formations and dispositions, relative motion, maneuvering board and tactical plots, rules of the road, and naval communications. Naval Science 132L is a concurrent requirement. One course. *Raup*

132L. Naval Operations Laboratory. Practical application of the theories of naval operations as presented in the lecture series. No credit. *Raup*

137L, 138L. Marine Tactics Laboratory. Concepts and applications of tactical employment of Marine Amphibious Forces. Ground weapons systems, land navigation, and small unit tactics. No credit. *Hamlin*

141S. Evolution of Warfare. Continuity and change in the history of warfare, with attention to the interrelationship of social, political, technological, and military factors. One course. *Hamlin*

145L. Naval Leadership and Management I. Study of organizational behavior and management in the context of naval organization. Topics include discussion of leadership and management functions of planning, controlling, and directing. Practical applications explored using case studies. No credit. *McClenney*

146L. Naval Leadership and Management II. The study of officer responsibilities in Naval administration. Discussions of counseling methods, military justice, human resources management, and supply systems. No credit. *Avery*

147L, 148L. Marine Leadership Laboratory. Marine Corps career management, naval correspondence, force structure, leadership techniques, and training. No credit. *Hamlin*

151S. Amphibious Operations. Development of amphibious doctrine, with attention to its current applications. One course. *Hamlin*

191. Independent Study. Directed reading and research. Open only to qualified students in junior and senior years by consent of director of undergraduate studies. One course. *Staff*

Neurobiology

For courses in Neurobiology, see Medicine (School)—Graduate (School) Basic Science Courses Open to Undergraduates

Neurosciences

For courses in neurosciences, see Biology, Psychology, and the Neurosciences Program.

Neurosciences Program

Professor W. G. Hall and Assistant Professor Nowicki, *Co-Directors*

The study of the nervous system has developed into one of the most exciting areas of modern science with rapidly expanding knowledge in both basic and medically applied areas. The Neurosciences Program offers the student guidance in planning a liberal arts education in the context of a structured emphasis on study in the neural sciences. The program especially encourages and facilitates undergraduate research participation, through independent study courses, in neuroscience laboratories across the university, including the Medical School—Graduate School Basic Sciences Department of Neurobiology. The program also sponsors special lectures, workshops, and research mini-symposia throughout the academic year designed to foster undergraduate interest in neurobiology.

Students may participate in the Neurosciences Program in one of three ways: (1) as biology majors with a neuroscience concentration in biology, (2) as psychology majors with a neuroscience concentration in psychology, or (3) as majors in other departments, by completing a sequence of required courses for a Neurosciences Program certificate. Two core courses, described below, are required for each of these options. Further, each option specifies a number of neuroscience electives, including independent study research courses, that are to be completed as part of the student's primary major. See Biology and Psychology for descriptions of neuroscience areas of concentration within these majors. Further details on the Neurosciences Program and neuroscience areas of concentration may be obtained from either of the co-directors at the program office (phone: 660-5725).

Core Courses

Psychology 103. Biological Bases of Behavior: Introduction and Survey. Physiological, developmental, and evolutionary approaches to behavior. Sensory and cognitive processes, sleep, pain, emotion, hunger, and thirst as well as maternal and sexual behavior patterns. Students required to participate as subjects in three to six hours of psychological research if not done in a previous introductory class. Prerequisite: Biology 14L, 19, 21L, or 22L; may be taken concurrently. One course. *C. Erickson or staff*

Biology 154. Principles of Neurobiology. Introduction to neuroscience, including basic physiology, microstructure, and anatomy of neural tissues; mechanisms of neuronal development and integration; sensory-motor control; the neural foundations of animal behavior, and the evolution of nervous systems. Prerequisites: Biology 21L, 22L or Biology 14L; and Chemistry 12L or equivalent. C-L: Psychology 135. One course. *Nowicki*

Elective Courses

The following is a partial listing of representative elective courses. For descriptions, consult the listings under specified departments in the undergraduate and graduate bulletins.

Developmental and Comparative Anatomy of Vertebrates. (Biology 108L.) *Staff*
Biochemistry of Marine Animals. (Biology 1155L.) *Rittschof*
Animal Behavior. (Biology 201L, S.) *Klopfer*
Building the Brain. (Distinguished Professor Course 189S, Neurobiology 189S, and Psychology 189S.) *Purves*
Marine Animal Navigation. (Biology 296.22S.) *Forward*
Animal Communication. (Biology 296.22S.) *Nowicki*
Learning and Adaptive Behavior. (Psychology 111.) *Higa*
Behavior and Neurochemistry. (Psychology 126.) *Cooper*
Fundamental Issues in the Study of the Brain. (Psychology 133.) *W. C. Hall*
Psychobiology of Motivation. (Psychology 139.) *Mulvey*
Methods in Behavioral Neurobiology. (Psychology 149S.) *W. G. Hall or Mulvey*
Hormones and Behavior. (Psychology 150S.) *Izard*
Neurobiology of Learning and Memory. (Psychology 165S.) *Swartzwelder*
Independent Study. (Biology 191, 192 and Psychology 191, 192, 193, 194.) *Staff*
Cellular Neurobiology. (Neurobiology 208.) *Augustine, Kauer, Lo, and Reinhart*
Systems Neurobiology. (Neurobiology 209.) *Cant and Fitzpatrick*
Developmental Neurobiology. (Neurobiology 211.) *Katz, LaMantia, and Purves*
Molecular Neurobiology. (Neurobiology 212.) *Matthew and Skene*

Pathology

For courses in pathology, see Medicine (School)—Graduate (School) Basic Science Courses Open to Undergraduates.

Pharmacology

For courses in pharmacology, see Medicine (School)—Graduate (School) Basic Science Courses Open to Undergraduates.

Persian

For courses in Persian, see Asian and African Languages and Literature.

Philosophy (PHL)

Professor Flanagan, *Chair*; Professor Mahoney, *Director of Undergraduate Studies*; Professors Brandon, Golding, and Sanford; Associate Professors Ferejohn, Posy, Stone (law), and Rapaport (public policy studies); Assistant Professors Cooper, Lind, and Schmaltz; Professors Emeriti Peach and Welsh; Adjunct Associate Professor Ward

A major is available in this department.

The undergraduate program in the Department of Philosophy acquaints students with the content and the structure of philosophical theory in various areas. Discussion is encouraged so that students can engage actively in the philosophical examination of problems.

Course offerings fall into two general categories: the systematic and the historical. In a systematic treatment, the organization of a course is primarily in terms of the problems presented by the subject matter of that course, as in logic, ethics, and metaphysics. In historical courses, attention is directed more to the order of development in the thought of a particular philosopher (Plato, Aristotle, Kant) or in a historical period. In all courses, reading of the works of philosophers acquaints the students with the important and influential contributions to the definition and solution of philosophical issues.

The problems raised in philosophy in respect to the various fields of the arts and sciences involve questions that are not normally given attention in those particular disciplines. In the consideration of such problems, therefore, it is expected that students will acquire some understanding and perspective of the major areas of the human intellectual endeavor. In this sense, philosophical comprehension is an essential part of a student's learning and education.

Philosophy provides a sound preparation for the demands of many professions. For example, the precision of argument and broad acquaintance with intellectual traditions emphasized in philosophy form an excellent basis for the study of law. Only one course from among Philosophy 41, 42, 43S, and 44S may be taken for credit. These courses are normally not open to juniors and seniors.

41. Introduction to Philosophy. (CZ) Examination of problems in philosophy; emphasis on metaphysics and theory of knowledge. One course. *Staff*

42. Introduction to Philosophy. (CZ) Examination of problems in philosophy; emphasis on ethics and value theory. One course. *Staff*

43S. Introduction to Philosophy. (CZ) Philosophy 41 conducted as a seminar. One course. *Staff*

44S. Introduction to Philosophy. (CZ) Philosophy 42 conducted as a seminar. One course. *Staff*

48. Logic. (CZ) The conditions of effective thinking and clear communication. Examination of the basic principles of deductive reasoning. One course. *Brandon, Posy, Sanford, or staff*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

100. History of Ancient Philosophy. (CZ) The pre-Socratics, Socrates, Plato, Aristotle, and post-Aristotelian systems. Not open to students who have taken Classical Studies 93 or Philosophy 93. Prerequisites: for first-year students, previous philosophy

course and consent of instructor. C-L: Classical Studies 100. One course. *Ferejohn or Mahoney*

101. History of Modern Philosophy. (CZ) Bacon, Hobbes, Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, and Kant. Not open to students who have taken Philosophy 94. Prerequisites: for first-year students, previous philosophy course and consent of instructor. One course. *Posy or Schmaltz*

102. Aesthetics: The Philosophy of Art. (CZ) The concept of beauty, the work of art, the function of art, art and society, the analysis of a work of art, criticism in the arts. One course. *Ward*

103. Symbolic Logic. (CZ) Detailed analysis of deduction and of deductive systems. Open to sophomores by consent of instructor. C-L: Linguistics. One course. *Brandon or Posy*

104. Philosophy of Science. (CZ) The principal philosophical and methodological problems in contemporary science. One course. *Brandon or Cooper*

106. Philosophy of Law. (CZ) Natural law theory, legal positivism, legal realism, the relation of law and morality. One course. *Golding*

107. Political and Social Philosophy. (CZ) The fundamental principles of political and social organizations. One course. *Mahoney*

109. Philosophy of Language. (CZ) A philosophical analysis of problems arising in the study of language and symbolism. Topics include: theories of language, the nature of signs and symbols, theories of meaning, types of discourse (scientific, mathematical, poetic), definition, ambiguity, metaphor. C-L: Linguistics. One course. *Posy*

110. Knowledge and Certainty. (CZ) Problems in the theory of knowledge: conditions of knowledge, scepticism, perception, memory, induction, knowledge of other minds, and knowledge of necessary truths. One course. *Ferejohn or Sanford*

111. Appearance and Reality. (CZ) Problems in metaphysics: theories of existence, substance, universals, identity, space, time, causality, determinism and action, and the relation of mind and body. One course. *Ferejohn or Sanford*

112. Philosophy of Mind. (CZ) Such topics as mind and body, the nature of thought, perception, consciousness, personal identity, and other minds. The relevance of cognitive psychology, neuroscience, and computer science to the philosophy of mind. One course. *Flanagan or Sanford*

113. Philosophy of Mathematics. (CZ) Survey of mathematical thought including the nature of infinity, Platonism, constructivism, and the foundational crisis of the early twentieth century. Prerequisite: one course in calculus or logic or philosophy; or consent of instructor. One course. *Posy*

115. Environmental Ethics. (CZ) Critical investigation of the goals of environmental policy and the values to which these goals give expression. Various "land health" issues such as biodiversity, ecosystem preservation, ecological restoration, agricultural practice, and pollution. One course. *Cooper*

116. Systematic Ethics. (CZ) Problems in moral philosophy: the nature of morality, ethical relativism, egoism, utilitarianism. Both historical and contemporary readings, with emphasis on the latter. One course. *Golding or Lind*

117. Ancient and Modern Ethical Theories. (CZ) The development of ethical thought in the West; the interaction between culture and ethical theory, with special reference to the Greek city-state, Roman law, the Renaissance, the Reformation, and the

rise of modern science. Readings in the great ethical philosophers. One course. *Flanagan, Golding, or Lind*

118. Philosophical Issues in Medical Ethics. (CZ) Ethical issues arising in connection with medical practice and research and medical technology. Definition of health and illness; experimentation and consent; genetic counseling and biological engineering; abortion, contraception, and sterilization; death and dying; codes of professional conduct; and the allocation of scarce medical resources. Prerequisites: for freshmen, previous philosophy course and consent of instructor. One course. *Brandon or Golding*

119. Medieval Philosophy. (CZ) Christian, Islamic, and Jewish philosophy from late antiquity to 1300. Special emphasis on historical influences and institutional developments. Nature and destiny of humans, existence and nature of God, problem of ethical norms, political philosophy. C-L: Medieval and Renaissance Studies. One course. *Mahoney*

120. Late Medieval and Renaissance Philosophy. (CZ) Problems of political authority and nature of the state, mysticism, humanism, critical trends, background of Galileo, and impact of the Reformation related to cultural and institutional changes. C-L: Medieval and Renaissance Studies. One course. *Mahoney*

122. Philosophical Issues in Feminism. (CZ) Issues in political and moral philosophy in their bearing on feminist concerns, including political equality and rights, preferential treatment, feminist and non-feminist critiques of pornography, and the morality of abortion. C-L: Women's Studies. One course. *Lind*

123. Aristotle. (CZ) Survey of principal topics in Aristotelian philosophy. Areas of study include metaphysics, epistemology, philosophy of science, philosophy of language, ethics, and political philosophy. C-L: Classical Studies 113. One course. *Ferejohn*

124. Philosophy of Education. (CZ) Alternative models of the educational process and of the relationship between education and moral development. The ideal of the "educated individual": education vs. training. The ideal of liberal learning: its moral context and its presuppositions. The educational process and its institutional settings. Readings from Plato, Aristotle, Aquinas, Rousseau, Kant, Whitehead, and others. One course. *Ward*

125. Philosophy of Music. (CZ) The nature of music and its place in the arts. Emotion and meaning, creation and interpretation in music. Readings from a wide variety of sources. One course. *Ward*

126. Philosophy of Sport. (CZ) Play, sport, and game in western culture. Sport and leisure. Sport vs. athletics. The discipline of the body. Competition and the urge to win. The concept of the "team" and ideals of individual performance. Spectatorship. The amateur and the professional. One course. *Ward*

130. Philosophy of Religion. (CZ) Selected concepts and doctrines. Not open to students who have taken Philosophy 101 (Philosophy of Religion). One course. *Staff*

131. Kant. (CZ) Immanuel Kant's philosophy, its background and influence. His early work in metaphysics and ethics and his mature philosophy of the "Critical Period" in which he wrote *The Critique of Pure Reason*, *The Critique of Practical Reason*, and *The Critique of Judgment*. Prerequisite: Philosophy 101. One course. *Posy*

132. Nineteenth-Century Philosophy. (CZ) Emphasis on Hegel, Marx, and Nietzsche. One course. *Staff*

134. Existentialism. (CZ) Themes and approaches in existential philosophy. Selected writings of Kierkegaard, Tolstoy, Dostoevsky, Heidegger, and Sartre. Contemporary relevance of existentialist perspectives. One course. *Ward*

139. Twentieth-Century Continental Philosophy. (CZ) A critical and historical examination of movements in European philosophy such as existentialism, structuralism, poststructuralism, hermeneutics, and critical theory. Husserl, Heidegger, Sartre, Gadamer, Habermas, and Derrida: their views of language, history, and the problems of modern society. One course. *Staff*

191, 192, 193, 194. Independent Study. Directed reading and research. Open only to highly qualified students in the junior and senior year with consent of the department. One course each. *Staff*

For Seniors and Graduates

203S. Contemporary Ethical Theories. (CZ) The nature and justification of basic ethical concepts in the light of the chief ethical theories of twentieth-century British and American philosophers. One course. *Flanagan, Golding, or Lind*

204S. Philosophy of Law. (CZ) Natural law theory and positivism; the idea of obligation (legal, political, social, moral); and the relation of law and morality. One course. *Golding*

206S. Responsibility. (CZ) The relationship between responsibility in the law and moral blameworthiness; excuses and defenses; the roles of such concepts as act, intention, motive, ignorance, and causation. One course. *Golding*

208S. Political Values. (CZ) Analysis of the systematic justification of political principles and the political values in the administration of law. One course. *Golding*

210. Logic for Computer Science. (QR) See C-L: Computer Science 242. One course. *Loveland or Nadathur*

211S. Plato. (CZ) Selected dialogues. C-L: Classical Studies 211S. One course. *Ferejohn*

217S. Aristotle. (CZ) Selected topics. C-L: Classical Studies 217S. One course. *Ferejohn*

218S. Medieval Philosophy. (CZ) Selected problems. C-L: Medieval and Renaissance Studies. One course. *Mahoney*

219S. Late Medieval and Renaissance Philosophy. (CZ) Selected problems. C-L: Medieval and Renaissance Studies. One course. *Mahoney*

225S. British Empiricism. (CZ) A critical study of the writings of Locke, Berkeley, or Hume with special emphasis on problems in the theory of knowledge. One course. *Lind or Schmaltz*

227S. Continental Rationalism. (CZ) A critical study of the writings of Descartes, Spinoza, or Leibniz with special emphasis on problems in the theory of knowledge and metaphysics. One course. *Schmaltz*

228S. Recent and Contemporary Philosophy. (CZ) A critical study of some contemporary movements, with special emphasis on analytic philosophers. C-L: Linguistics. One course. *Posy*

231S. Kant's Critique of Pure Reason. (CZ) One course. *Posy*

232S. Recent Continental Philosophy. Selected topics. One course. *Staff*

233S. Methodology of the Empirical Sciences. (CZ) Recent philosophical discussion of the concept of a scientific explanation, the nature of laws, theory and observation, probability and induction, and other topics. Consent of instructor required. One course. *Brandon or Cooper*

234S. Problems in the Philosophy of Biology. (NS) Selected topics, with emphasis on evolutionary biology: the structure of evolutionary theory, adaptation, teleological or teleonomic explanations in biology, reductionism and organicism, the units of selection, and sociobiology. Consent of instructor required. C-L: Biology 234S. One course. *Brandon*

235S. Nineteenth-Century German Philosophy. (CZ) A critical examination of the writings of Hegel, Marx, or Nietzsche. One course. *Staff*

250S. Topics in Formal Philosophy. (CZ) Topics selected from formal logic, philosophy of mathematics, philosophy of logic, or philosophy of language. C-L: Linguistics. One course. *Posy*

251S. Epistemology. (CZ) Selected topics in the theory of knowledge; for example, conditions of knowledge, scepticism and certainty, perception, memory, knowledge of other minds, and knowledge of necessary truths. One course. *Sanford*

252S. Metaphysics. (CZ) Selected topics: substance, qualities and universals, identity, space, time, causation, and determinism. One course. *Sanford*

253S. Philosophy of Mind. (CZ) Analysis of concepts such as thought and belief; issues such as mind-body relations, thought and action, the nature of persons and personal identity. One course. *Sanford*

289S. Environmental Ethics. (CZ) Selected topics involving values and the environment, for example, extending morality to nature, rights of future generations, environmental aesthetics, diversity and stability, ideological biases in ecological knowledge. Consent of instructor required. C-L: Environment 282S. One course. *Cooper*

291S, 292S. Special Fields of Philosophy. One course each. *Staff*

COURSES CURRENTLY UNSCHEDULED

105. Philosophy of History. (CZ)

108. Social Ideals and Utopias. (CZ)

114D. Hellenistic Philosophy. (CZ)

121. Philosophy and Film. (CZ)

135. Philosophy in Literature. (CZ)

138. Analytic Philosophy in the Twentieth Century. (CZ)

196S, 197S, 198S, 199S. Seminars in Philosophy

202S. Aesthetics: The Philosophy of Art. (CZ)

205S. Philosophy of History. (CZ)

254S. Topics in Philosophy of Religion. (CZ)

THE MAJOR

Major Requirements. Eight courses in philosophy including Philosophy 100 and 101; at least one nonintroductory course in moral, social, political, or legal philosophy, such as Philosophy 106, 107, 108, 116, 117, 118, or 122; and at least one course at the 200 level. In addition, a course in logic is highly recommended.

Honors/Distinction. The department offers work leading to graduation with distinction. See the section on honors in this bulletin.

Physics (PHY)

Professor Evans, *Chair*; Professor Walter, *Director of Undergraduate Studies*; Professors Behringer, Bilpuch, Fortney, Goshaw, Han, Johnson, Madey, Meyer, Müller, Palmer, Roberson, Robinson, Thomas, Walker, and Weller; Associate Professors Greenside, Howell, and Oh; Assistant Professors Gauthier, Lee, Socolar, Springer, and Teitsworth; Research Associate Professors Litvinenko and Tornow; Research Assistant Professor Phillips; Adjunct Professors Guenther, Iafrate, Rogosa, and Stroschio; Adjunct Associate Professors Lawson and Skatrud; Adjunct Assistant Professors Everitt and Kolena; Visiting Assistant Professor Brown; Lecturer Haque

A major is available in this department.

Through the study of physics students learn the methods and results of a systematic examination of the objects that make up the natural universe and of their interactions with each other. The knowledge and analytical skills thus obtained are basic to the study of the sciences and engineering. The department offers a number of courses for nonspecialists who wish to learn about the physicist's description of nature for its intrinsic intellectual value.

21, 22. Introductory Physics. Credit for advanced placement on the basis of the College Board Examinations "Physics-C." One course each.

32. Physics from the Historical Perspective. (NS) The historical development of physical theories is traced from early theories of the solar system to relativity and quantum theory. No previous study of physics is assumed, but the student must be able to use simple mathematics through basic algebra. One course. *Staff*

35. Practical Physics. (NS) Fundamental concepts and laws of physics in the context of technological applications. Intended for persons not majoring in science or engineering; no previous knowledge of physics is assumed. The emphasis is on "how things work." One course. *Staff*

36. Acoustics and Music. (NS) The physical principles underlying musical instruments, room acoustics, and the human ear. Analysis, reproduction, and synthesis of musical sounds. No previous knowledge of physics is assumed. C-L: Music 36. One course. *Lawson*

41L, 42L. Fundamentals of Physics. (NS) For students interested in majoring in physics; taken in the freshman year. Basic principles of physics, mainly classical, at a level similar to Physics 51L, 52L, but with emphasis on laying a foundation for further study. Lecture, recitations, and laboratory. Closed to students having credit for Physics 51L, 52L. Prerequisites: consent of director of undergraduate studies; Mathematics 31 and 32 may be taken concurrently. One course each. *Goshaw or Roberson*

51L, 52L. Introductory Technical Physics. (NS) A survey of the principles of classical physics, intended principally for students in the physical sciences and engineering. Students planning a major in physics should enroll instead in Physics 41L, 42L in their freshman year. Physics 51L is closed to students having credit for Physics 41L or Physics 53L; Physics 52L is closed to students having credit for Physics 42L or Physics 54L. Prerequisite: Mathematics 31, 32 or equivalent; Mathematics 32 may be taken concurrently with Physics 51L; for 52L: Physics 51L or 53L. One course each. *Staff*

53L, 54L. General Physics. (NS) A survey of the principles of physics, intended mainly for students planning study in medicine or the life sciences. The level and coverage are similar to that of Physics 51L, 52L, but there are differences in emphasis. Physics 53L is closed to students having credit for Physics 41L or Physics 51L; Physics 54L is closed to students having credit for Physics 42L or Physics 52L. Prerequisite:

Mathematics 31, 32 or equivalent; Mathematics 32 may be taken concurrently with Physics 53L; for 54L: Physics 51L or 53L. One course each. *Behringer and Howell*

55. Introduction to Astronomy. (NS) The evolving theory of the physical universe. Cosmological models, galaxies, stars, interstellar matter, the solar system, and experimental techniques and results. Several observatory sessions. One course. *Everitt*

100. Introduction to Modern Physics. (NS) Survey of modern physics including relativity and the quantum physics of atoms, nuclei, particles, and quarks. Not applicable toward a major in physics. Prerequisites: Physics 42L, 52L, or 54L and Mathematics 103 (may be taken concurrently). One course. *Han*

105. Introduction to Astrophysics. (NS) Basic principles of astronomy treated quantitatively. Cosmological models, galaxies, stars, interstellar matter, the solar system, and experimental techniques and results. Prerequisites: Mathematics 31 and Physics 42L, 52L, 54L or consent of instructor. One course. *Kolena*

143L. Optics and Modern Physics. (NS) Intended as a continuation of Physics 41L, 42L. Classical wave and ray optics. Introduction to quantum physics. Prerequisites: Physics 42L, 52L, or 54L and Mathematics 103 (may be taken concurrently). One course. *Walter*

Physics 42L, 52L, or 54L or equivalent, and Mathematics 103 or equivalent are prerequisites to all of the following courses.

171L. Electronics. (NS) Elements of electronics including circuits, transfer functions, solid-state devices, transistor circuits, operational amplifier applications, digital circuits, and computer interfaces. Lectures and laboratory. One course. *Fortney*

176. Thermal Physics. (NS) Thermal properties of matter treated using the basic concepts of entropy, temperature, chemical potential, partition function and free energy. Topics include the laws of thermodynamics, ideal gases, thermal radiation and electrical noise, heat engines, Fermi-Dirac and Bose-Einstein distributions, semiconductor statistics, kinetic theory, and phase transformations. Prerequisites: Physics 51L, 52L or equivalent and Mathematics 103 or equivalent. C-L: Electrical Engineering 176. One course. *McCumber or Teitsworth*

181. Introductory Mechanics. (NS) Newtonian mechanics at the intermediate level, Lagrangian mechanics, linear oscillations, special relativity. Prerequisite: Mathematics 111 or equivalent (may be taken concurrently). One course. *Gauthier*

182. Electricity and Magnetism. (NS) Electrostatic fields and potentials, boundary value problems, magnetic induction, energy in electromagnetic fields, Maxwell's equations, introduction to electromagnetic radiation. Prerequisite: Mathematics 111 or equivalent. One course. *Evans*

185, 186. Modern Optics. (NS) Optical processes including the propagation of light, coherence, interference, and diffraction. Consideration of the optical properties of solids with applications to modern optical devices. Second semester will emphasize nonlinear interactions, optical modulators, lasers, and spectroscopy. Lecture and laboratory projects. One course each. *Guenther*

191, 192. Independent Study. Consent of instructor required. One course each. *Staff*

For Seniors and Graduates

205. Introduction to Nuclear Physics. (NS) Phenomenological aspects of nuclear physics, interaction of gamma radiation and charged particles with matter, nuclear detectors, particle accelerators, radioactivity, basic properties of nuclei, nuclear system-

atics, nuclear reactions, particle scattering, nuclear models of the deuteron, nuclear forces, parity. One course. *Weller*

211. Fundamentals of Quantum Mechanics. (NS) Waves and particles, Schrödinger equation, Dirac notation and mathematical tools, fundamental postulates, angular momentum and addition of angular momentum, applications to spin systems, harmonic oscillators, and the hydrogen atom. Prerequisites: Mathematics 111 and Physics 181. One course. *Springer*

212. Applications of Quantum Mechanics. (NS) Application of the fundamental postulates to atomic structure and spectra, solid state phenomena, statistical physics, scattering, perturbative techniques, treatment of systems of identical particles, and nuclear and particle physics phenomenology. Prerequisite: Physics 211. One course. *Springer*

213. Nonlinear Dynamics. (QR) Prerequisites: Computer Science 8 or 53, Mathematics 111, and Physics 51L, 52L. See C-L: Computer Science 264. One course. *Behringer or Greenside*

214. Introduction to Solid-State Physics. (NS) Discussion of solid-state phenomena including crystalline structures, X-ray and particle diffraction in crystals, lattice dynamics, free electron theory of metals, energy bands, and superconductivity, with emphasis on understanding electrical and optical properties of solids. Prerequisite: quantum physics at the level of Physics 143L or Electrical Engineering 211. C-L: Electrical Engineering 214. One course. *Teitsworth*

215. Principles of Quantum Theory. (NS) Topics include original and fundamental concepts of quantum theory, atoms, scattering theory, matrix mechanics, rotation, and angular momentum. One course. *Thomas*

217S. Advanced Physics Laboratory and Seminar. (NS) Experiments involving the fields of electricity, magnetism, heat, optics, and modern physics. One course. *Meyer*

222S. General Relativity. (NS) Review of special relativity; ideas of general relativity; mathematics of curved space-time; formation of a geometric theory of gravity; Einstein field equation applied to problems such as the cosmological red-shift and blackholes. Prerequisites: Physics 181 and Mathematics 111 or equivalents. One course. *Lee*

225, 226. Elementary Investigations. (NS) Training in the laboratory and library methods of physical research. Qualified students may conduct elementary investigations under the supervision of a member of the staff. One course each. *Staff*

230. Mathematical Methods in Physics. (QR) Includes topics in complex analysis, residue calculus, infinite series, integration, special functions, Fourier series and transforms, delta functions, and ordinary differential equations; and use of MATHEMATICA for graphical, symbolic, and numerical computation. Prerequisite: Mathematics 111. One course. *Palmer*

231. Mathematical Methods in Electromagnetism. (NS) Mathematical topics include vector calculus, curvilinear coordinates, partial differential equations, orthogonal functions, Legendre polynomials, spherical harmonics, Bessel functions, and Green's functions. Topics from electromagnetism include Maxwell's equations, electrostatics, magnetostatics, potential theory, boundary-value problems, macroscopic media, and electromagnetic waves. Uses MATHEMATICA. Prerequisite: Physics 230. One course. *Palmer*

244. Nuclear and Particle Physics. (NS) Current ideas and models in nuclear and particle physics. Experimental methods; nuclear structure; nuclear reactions; families of

elementary particles; quarks and gluons; weak interactions. Prerequisite: Physics 211. One course. *Staff*

261. Laser Physics. (NS) Laser physics and laser theory. Electromagnetic radiation and its interaction with matter. Laser excitation, oscillation, modulation, and detection theory. Prerequisites: Physics 182 and Physics 211. One course. *Skatrud*

271. Quantum Optics. (NS) The linear and nonlinear interaction of electromagnetic radiation and matter. Topics include simple theory of lasers, second-harmonic generation, photon echos, bistability, Raman scattering, Brillouin scattering, phase conjugation, two photon lasers, and cooling and trapping of atoms. Prerequisites: Physics 212 and 231. One course. *Gauthier*

281. Classical Mechanics. (NS) Newtonian, Lagrangian, and Hamiltonian methods for classical systems; symmetry and conservation laws; rigid body motion; normal modes and forced oscillations; small nonlinear oscillations; canonical transformations; Hamiltonian chaos. One course. *Socolar*

COURSES CURRENTLY UNSCHEDULED

102. Applications of Modern Physics in Medicine. (NS)

106. Topics in Astrophysics. (NS)

240. Computer Applications to Physical Measurement. (NS)

THE MAJOR

Students majoring in physics are prepared for work in industrial and governmental laboratories. They are also prepared for graduate work in physics or for the study of medicine. Students planning to major in physics should enroll in Physics 41L, 42L in their freshman year. They should also arrange to complete the necessary mathematics as soon as possible.

For the A.B. Degree

Prerequisites. Physics 41L, 42L or 51L, 52L or 53L, 54L, or equivalents; Mathematics 31, 32, 103, 111, or equivalents, and one additional course at the 100 or 200 level.

Major Requirements. Physics 143L, 171L, 176, 181, and two other courses in physics above 100 other than Physics 230 and 231.

For the B.S. Degree

Prerequisites. Physics 41L, 42L or 51L, 52L or 53L, 54L, or equivalents; Mathematics 31, 32, 103, 111, or equivalents, and one additional course at the 100 or 200 level.

Major Requirements. Physics 143L, 171L, 176, 181, 182, 211, and two other courses in physics above 100 (except for Physics 230 and 231), at least one of which must be a laboratory course. Students planning graduate study in physics are urged to take one additional elective in physics and one in mathematics. (For the major, Physics 230 and 231 are considered mathematics courses).

Honors/Distinction

The department offers upperclassmen the possibility of being associated with research conducted in the department. This work may lead to graduation with distinction. The department also offers Latin honors by honors project. See the section on honors in this bulletin.

Polish

For courses in Polish, see Slavic Languages and Literatures.

Political Science (PS)

Professor Aldrich, *Chair*; Professor Holsti, *Director of Undergraduate Studies*; Professors Ascher, Barber, Fish, Grieco, Horowitz, Hough, Keohane, Kitschelt, Kornberg, Lange, Mieckiewicz, Paletz, Price, and Spragens; Associate Professors Eldridge, Gillespie, Johns, and McKean; Assistant Professors Archer, Bianco, Brehm, Coles, Feaver, Grant, Gronke, Hamilton, Lomperis, Niou, Orr, Shi, Simmons, and Smith; Professors Emeriti Ball, Braibanti, Cleaveland, Hall, and Leach; Adjunct Professors Kessler and O'Barr

A major is available in this department.

Courses in political science for undergraduates are offered in four fields: (A) American government, politics, and public administration; (B) comparative government and politics; (C-N) normative political theory/(C-E) empirical political theory and methodology; and (D) international law, relations, and politics. In the course descriptions below the field within which the course falls is indicated by the appropriate letter symbol (A, B, C-N/C-E, or D) after the course title. (The area of knowledge designation follows.) Courses numbered from 91 through 94 serve as an introduction both to the study of political science and to the subject matter and approaches of the relevant field. Middle and upper-level courses and seminars (numbered at the 100 and 200 levels respectively) consider particular aspects and topics within the field. In addition, independent study under faculty supervision enables students to explore topics of special interest. See below, following the course descriptions, for the listing of courses by fields, information on internships, and requirements for the major and honors.

INTRODUCTORY COURSES

The following courses introduce the study of political science. Courses numbered 91 through 94 each serve as the basic course in one of the four fields of the discipline. Students ordinarily will take at least one of these courses before proceeding to more advanced courses. Some advanced courses may require a particular introductory course as a prerequisite.

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

90A. American Government and Politics (A). Credit for advanced placement on the basis of the College Board examination in American government and politics. Does not satisfy course requirements of the political science major. One course.

90B. Comparative Government and Politics (B). Credit for advanced placement on the basis of the College Board examination in comparative government and politics. Does not satisfy course requirements of the political science major. One course.

91. The American Political System (A). (SS) Theory and practice of American government and politics; federal-state relations; the separation and interrelationships of the executive, legislative, and judicial branches of government; judicial review; the role of political parties and public opinion; the formulation and execution of domestic and foreign policy; civil liberties. One course. *Staff*

91D. The American Political System (A). (SS) Same as Political Science 91 except instruction is provided in two lectures and one small discussion meeting each week. One course. *Bianco*

92. Comparative Politics (B). (SS) Topics include problems of conceptualization and analysis; foundations of politics under democratic, authoritarian, and totalitarian regimes; theories of development and underdevelopment; revolution and collective violence; the role of elites, such as the military. C-L: Comparative Area Studies. One course. *Staff*

92D. Comparative Politics (B). (SS) Same as Political Science 92 except instruction is provided in two lectures and one small discussion meeting each week. One course. *Archer*

93. Elements of International Relations (D). (SS) The nature of international politics, the analysis of national power, the instruments of foreign policy, and the controls of state behavior. One course. *Staff*

93D. Elements of International Relations (D). (SS) Same as Political Science 93 except instruction is provided in two lectures and one small discussion meeting each week. One course. *Eldridge, Feaver, or Lomperis*

94. Contemporary Political Ideologies (C-N). (SS) Liberalism, conservatism, socialism, fascism, and feminism. One course. *Staff*

94D. Contemporary Political Ideologies (C-N). (SS) Same as Political Science 94 except instruction is provided in two lectures and one small discussion meeting each week. One course. *Staff*

98. Introduction to Canada. (SS) See C-L: Interdisciplinary Course 98; also C-L: Canadian Studies, Economics 98, History 98, and Sociology 98. One course. *Leclerc or Thompson*

COURSES TAUGHT IN DUKE STUDY ABROAD PROGRAMS

100, A-N. Duke University Overseas Program. (SS) This number represents course credit for political science courses taken in Duke University Summer Session Study Abroad Programs or in Duke University semester or academic year programs with overseas universities. Register for program by designated suffix A through N. C-L: Comparative Area Studies. Variable credit.

100A. Duke Semester/Academic Year Program: Berlin. (FL, SS)

.01 Environmental Policy in Europe (B) (SS). Not open to students who have taken Political Science 162. One course.

.02 Germany: From Division to Unification (D) (FL,SS).

Taught in German. Not open to students who have taken Political Science 134. One course. C-L: Comparative Area Studies. Variable credit.

100B. Duke Summer Program: Brazil. (SS)

.01 Authoritarianism and Democracy in Brazil (B). One course.

.02 Brazil in World Politics (D).

One course. C-L: Comparative Area Studies. Variable credit.

100C. Duke Summer Program: Zimbabwe/Botswana. (SS)

.01 Politics and Literature in Southern Africa (B). One course.

.02 Issues of Development and Dependence in Botswana and Zimbabwe (D).

One course. C-L: African and Afro-American Studies 100 and Comparative Area Studies. Variable credit.

100E. Duke Summer Program: London. (SS) .01 Media and Politics in Britain (B).

C-L: Comparative Area Studies. Two courses.

100F. Duke Summer Program: Israel. (SS) .01 Israel from Utopia to History (B). C-L:

Comparative Area Studies. One course.

100G. Duke Summer Program: Mexico. (SS) .01 United States-Latin American

Relations (D). C-L: Comparative Area Studies. One course.

100H. Duke Semester Program: Bologna. (SS) .01 Italian Politics from the Risorgi-

mento to the Present (B). C-L: Comparative Area Studies. One course.

100J. Duke Wind Symphony Semester Program: Vienna. (SS) .01 Government and Politics of Austria in Europe (B). C-L: Comparative Area Studies. One course.

100K. Duke Summer Program: Cambridge (England). (SS)

.01 Anglo-American Constitutionalism, Law, and Legal Institutions (A). Not open to students who have taken Political Science 100D.01. One course.

.02 British Government and Constitutional Law (B). Not open to students who have taken Political Science 100D.02. One course. C-L: Comparative Area Studies. Variable credit.

100L. Duke Summer Program: Oxford. (SS)

.01 Political System of Modern Britain (B). Not open to students who have taken Political Science 199B: Oxford. Two courses.

.02 Law and Liability: Personal Injury in Britain and the United States (B). Not open to students who have taken Political Science 199B: Oxford. Two courses. C-L: Comparative Area Studies. Variable credit.

100M. Duke Summer Program: Spain. (SS) .01 Government and Politics of Spain (B). Not open to students who have taken Political Science 117: Comparative Government and Politics: Spain. C-L: Comparative Area Studies. One course.

100N. Duke in Brussels. (SS)

.01 The European Community: Progress, Problems, and Prospects. One course.

.02 The United States and Western Europe. One course. C-L: Comparative Area Studies and Public Policy Studies 100A. Variable credit. *Grieco*

OTHER UNDERGRADUATE COURSES

101A, S. Issues in Twentieth-Century American Political Practice (A). (SS) Seminar on the nature of American government. Selected contemporary problems and institutions. Open only to students in the Twentieth-Century America (FOCUS) Program. One course. *Staff*

101B, S. Issues in Twentieth-Century Political Development (B). (SS) Seminar on agrarian origins of human societies and transitions to industrial societies with attendant economic growth, political conflict, and revolution. Politics of development examined; experiences of modern Africa, Soviet Union, and Viet Nam considered and compared to lessons supplied by Medieval Europe. Open only to students in the FOCUS Program, Contemporary Global Culture. One course. *Staff*

101C, S. Issues in Twentieth-Century American Political Theory (C-N). (SS) Seminar on contemporary issues of American political thought. Attempts to refurbish or develop alternatives to the dominant liberal tradition. Open only to students in the Twentieth-Century America (FOCUS) Program. One course. *Staff*

102. Comparative Analysis of Democratic Institutions (B). (SS) The selection and consequences of democratic political institutions with special emphasis on electoral systems and constitutions. One course. *Niou*

103. Introduction to Urban Politics (A). (SS) Theory and practice of American city politics: relationships between governmental structures and historical development; distribution of power; constituency demands. One course. *Orr*

104. Politics and Literature (C-N). (SS) The enduring questions of politics and political philosophy illustrated in Western literature: historical, literary, and philosophical analysis. One course. *Gillespie or Grant*

105. The Politics of Democratization in Eastern Europe (B). (SS) Overview of political regimes in selected East European countries, comparative analysis of modes of

transition to democracy: constitutionalism, party systems and voting, private property rights and economic regulation under socialism and capitalism. One course. *Kitschelt*

106. International Security (D). (SS) International conflict in modern times. Causes and effects of war. Contemporary and future threats. One course. *Feaver*

107. Comparative Environmental Policies (B). (SS) Comparative analysis of environmental problems and policies in politically diverse industrialized nations including the United States, Russia, and Japan. C-L: Comparative Area Studies and Public Policy Studies 107. One course. *McKean*

108. The American Presidency (A). (SS) The presidency and its impact on the American political system. One course. *Paletz*

109. State and Local Government Today (A). (SS) Problems in state, county, and city government. One course. *Orr*

110. American Political Parties (A). (SS) Introduction to party systems with application to the United States, including parties in the electorate, parties as organizations, and parties in government. One course. *Gronke*

111. Contemporary Japanese Politics (B). (SS) Introduction to political change in postwar Japan. Foundations of the modern industrial state, electoral politics, policy-making and bureaucracy, defense, foreign policy, and foreign trade. C-L: Comparative Area Studies. One course. *McKean*

115. Politics and Society in Germany (B). (SS) Industrialization, democratization, and fascism in Germany; social structure, political institutions, and political culture; selected public policies; Germany in the world economy and in world politics. C-L: Comparative Area Studies. One course. *Kitschelt*

117. Comparative Government and Politics: Selected Countries (B). (SS) Special topics course treating the political system of one or more countries from a comparative perspective. One course. *Staff*

118. American Constitutional Development (A). (SS) Development of the United States Constitution through Supreme Court decisions, 1790 to the present. One course. *Fish*

120. International Conflict and Violence (D). (SS) Nature and processes of international conflict and violence with emphasis on contemporary instances of violence in international affairs. Consideration of restraints on violence. One course. *Eldridge*

121. International Organization (D). (SS) Political aspects of military and economic organizations at the global and regional levels of the international system. One course. *Grieco*

122. Modern International Politics (D). (SS) The major problems in contemporary international affairs with attention to superpower politics, specific regional concerns, and the problems associated with the emergence of a new international economic order. One course. *Eldridge or Lomperis*

123. Introduction to Political Philosophy (C-N). (SS) The nature and enduring problems of political philosophy, illustrated by selected theorists in the Western political tradition. One course. *Staff*

124. National Economic Statecraft (D). (SS) Identification and analysis of major sources of foreign policy, range of state political-economic goals in the international system, and policy instruments available to state pursuit of such goals. One course. *Grieco*

125. Strategies of Comparative Analysis (B). (SS) See C-L: Comparative Area Studies 125; also C-L: Cultural Anthropology 125, History 137, Religion 121, and Sociology 125. One course. *Staff*

126. Theories of Liberal Democracy (C-N). (SS) Critical discussion of classic theorists, such as Locke, Rousseau, Mill, and Madison, and contemporary theories of liberal democracy. One course. *Grant or Spragens*

127. Law and Politics (A). (SS) Nature and functions of law; Anglo-American legal institutions; the process of judicial decision making; and the relationships among judges, lawyers, legislators, and administrators in the development of public as well as private law. One course. *Fish*

128. Politics of the Executive Branch (A). (SS) Policy-making in the executive branch of government: office of the president, cabinet, and independent agencies. Emphasis on relations with Congress and the courts. One course. *Staff*

130S. Voluntary Organizations and Social Policy (A). (SS) See C-L: Public Policy Studies 130S. One course. *Smith*

131. Introduction to American Political Thought (C-N). (SS) Basic elements in the American political tradition as developed from its English roots to the present. One course. *Grant or Spragens*

132. Politics of Asia (B). (SS) The impact of nationalism, development, and revolution on traditional Asian society and its emerging states. C-L: Comparative Area Studies. One course. *Lomperis*

133. Japanese Foreign Relations (D). (SS) Japan's increasing world role; emphasis on economic foreign policy and United States-Japanese relations. C-L: Comparative Area Studies. One course. *McKean*

135. Political Development of Western Europe (B). (SS) The development of the modern political systems of Britain, France, Germany, and other European countries; the spread of capitalism, the emergence of mass democracy and the rise of the welfare state. Contemporary developments examined in historical and theoretical perspective. C-L: Comparative Area Studies. One course. *Kitschelt or Lange*

136. Comparative Government and Politics: Western Europe (B). (SS) Modern political institutions and processes of European democracies: political parties, interest groups and parliaments; regional, religious, and class divisions; political participation and mobilization; relationships of state, society and economy; political, social and economic change in postwar Europe. C-L: Comparative Area Studies. One course. *Kitschelt or Lange*

137. Campaigns and Elections (A). (SS) An introduction to voting and elections in the United States, with emphasis on presidential nomination and election procedures, characteristics of the American electorate, and theories of voting behavior in presidential and congressional elections. One course. *Aldrich, Brehm, or Gronke*

138. Quantitative Political Analysis I (C-E). (QR) Basic applications of statistical methods to the analysis of political phenomena. Emphasis on research design, graphical display, probability, testing of hypotheses, statistical inference, and the use of computers. One course. *Brehm*

139. Conflict, Collusion, and Cooperation (C-E). (SS) How actors in the political process manipulate information, institutions, and strategies to produce preferred outcomes. Applications to elections, legislative behavior, international conflict, and other areas. One course. *Bianco or Niou*

140. Feminist Theory (C-N). (SS) Exploration of contemporary American feminist thought challenging traditional forms of power and the relationship between public and private reason and unreason. Included are works by liberal, radical, lesbian, and socialist feminists as well as works which address issues of concern specific to women of color. One course. *Staff*

141. Introduction to African-American Politics (A). (SS) Traces the history, evolution, and maturation of the African-American political experience in America from the colonial period through contemporary times. Impact of Afro-American political participation on the American political process and American public policy. C-L: African and Afro-American Studies 149. One course. *Orr*

142. War and Peace (D). (SS) The use of systems theory in comparative political history to explain why some international systems during particular periods have been plagued by war while others have been relatively peaceful. Special attention given to the Bismarckian system. One course. *Staff*

143. Politics of Liberties (A). (SS) Theory and development of the Bill of Rights through Supreme Court decisions. One course. *Fish*

144. Force and Statecraft (D). (SS) Theory and practice of the use of force as an instrument of state policy in international relations. Prerequisite: Political Science 93 or equivalent. One course. *Feaver*

145. Political Analysis for Public Policy-Making (A). (SS) Prerequisite: Political Science 90A, 91, 101, or equivalent. See C-L: Public Policy Studies 114. One course. *Ascher, Hamilton, Mayer, Mickiewicz, Miller, or Smith*

146. American Legislative Behavior (A). (SS) An introduction to the American legislative process, with specific focus on the U.S. Congress. Emphasis on legislative rules and procedures, congressional elections, and the behavior of legislators in their representative and policy-making roles. One course. *Bianco or Gronke*

147. International Environmental Politics and Policies (D). (SS) Environmental issues in developing countries in the context of the North-South problem; transboundary pollution problems and international trade; problems of the global commons (such as the deep sea, the upper atmosphere, genetic resources); international organizations and environmental policy. C-L: Comparative Area Studies and Public Policy Studies 147. One course. *McKean or Miranda*

151. Introduction to Latin American Politics (B). (SS) Historical and cultural context of political institutions and behavior, the role of traditional and emerging groups and forces, political instability and the decision-making process. C-L: Comparative Area Studies. One course. *Archer*

153, 154. Politics and the Media of Mass Communication 153 (B), 154 (A). (SS) Analysis of the nature, organization, and products of the mass media (especially the movie, television, and newspaper industries) as they affect the political systems, political processes, institutions, and people of the United States and other nations. Open to juniors and seniors. It is desirable but not required that students taking 153 continue with 154. With consent of the instructor, students who have not taken 153 may enroll in 154. C-L: Comparative Area Studies; Film and Video; and Women's Studies. One course each. *Paletz*

155. The Politics and Economics of Developing Areas (B). (SS) Process and politics of transition of rural and agrarian societies to urban and industrial societies: Soviet Union, United States, India, Africa, and Asia. C-L: Comparative Area Studies. One course. *Staff*

157D. Foreign Policy of the United States (D). (SS) Sources of American foreign policy, containment, international economic policy, deterrence, arms control, and disarmament. Prospects for the future. Emphasis on the period since World War II. One course. *Holsti*

159. Ambition and Politics (C-N). (SS) A theoretical examination of the role of ambition in politics, including works by or on Homer, Plato, Plutarch, Machiavelli, Shakespeare, Tocqueville, Nietzsche, and Hitler. One course. *Gillespie*

160. Contemporary Global Issues (D). (SS) See C-L: Comparative Area Studies 109; also C-L: Cultural Anthropology 109, History 109, and Sociology 175. One course. *Staff*

164. Political Organizations (A). (SS) Using classical organization theory and research on decision-making behavior of the members of political organizations to study those organizations (such as political parties, labor unions, businesses, and public bureaucracies). One course. *Brehm*

165. Government and Politics of the Soviet Union (B). (SS) Analysis of the Soviet political system, emphasizing the sources of stability and instability and the responsiveness of its policies. Literature on the non-Soviet world (notably the United States) will be included. C-L: Comparative Area Studies. One course. *Hough*

166. Soviet Foreign Relations (D). (SS) Nature of the Soviet Union's relations with other states. Determinants and formulation of foreign policy. C-L: Comparative Area Studies. One course. *Hough*

167. International Law (D). (SS) Introduction to the main concepts and themes in public international law. The role of states and international organizations in international law, treaties, the law of the sea, human rights, self-determination, and European integration. The sources of international law and its impact on state action. One course. *Simmmons*

168. Analysis of Political Decision Making (C-E). (SS) Surveys of some of the most prominent problems, methods, ideas, and findings that have emerged in recent theoretical studies of politics. Intellectual puzzles, speculative models and normative and explanatory applications, individual decision theory, game theory, and social choice theory. Not open to students who have taken Political Science 139. One course. *Niou*

170. Europe Transformed (D). (SS) Transformation in intra-European relations since 1980. Topics covered: the Cold War and its termination in Europe, Warsaw Pact dissolution, new roles for NATO, European Community, and United States in Europe. C-L: Comparative Area Studies. One course. *Grieco*

171. Politics of South African Apartheid (B). (SS) The South African political system in the twentieth century, with particular attention to the economic and ethnic roots of racial conflict. United States-South African relations. C-L: African and Afro-American Studies 171 and Comparative Area Studies. One course. *Johns*

173S. Political Economy of World Food Problems (B). (SS) Changing policies toward food production and distribution. Topics include American agricultural policy, international food and famine aid, and Third World agricultural development strategies. C-L: Comparative Area Studies. One course. *Johns*

174S. Political Biography (A). (SS) Nature of politics as revealed in the life histories of individuals. Readings in single biographies and autobiographies, but with some comparative work. Students project their autobiographies toward possible political futures. One course. *Barber*

176A. Perspectives on Food and Hunger (B). (SS) See C-L: Interdisciplinary Course 120A; also C-L: Comparative Area Studies. One course. *Johns*

176B. Perspectives on Food and Hunger (B). (SS) See C-L: Interdisciplinary Course 120B; also C-L: Comparative Area Studies. One course. *Johns*

179. Ecological Crisis and Political Theory (C-N). (SS) Interconnections between various dimensions of the ecological crisis including: conceptions of self, nature, ecological ethics, and environmental justice as related to politics, economics, and new social movements. One course. *Coles*

180. Media in Comparative Perspective (B). (SS) See C-L: Interdisciplinary Course 182; also C-L: Canadian Studies, Comparative Area Studies, Film and Video, and Sociology 182. One course. *Smith*

181. Marxism and Neo-Marxism (C-N). (SS) Development of Marxism from Marx to the present. Critiques of capitalist political culture; the methodological underpinnings of various theorists, the conceptions of self and society which have animated these critiques. Works by Marx, Engels, Luxemburg, Lenin, Adorno, Horkheimer, Marcuse, Gramsci, Lukacs, Merleau-Ponty, Sartre, Habermas. One course. *Coles*

182. Classical Political Philosophy (C-N). (CZ) Ancient theories of the way of life and the political regime best suited to promote happiness in human communities. Readings from the Greek sophists, Aristophanes, Plato, Aristotle, the academic skeptics, Stoics, and Cicero. Prerequisite: junior standing; open to sophomores by consent of instructor. One course. *Staff*

184S. Canadian Issues (B). (SS) Prerequisite: Interdisciplinary Course 98 or consent of instructor. See C-L: Interdisciplinary Course 184S; also C-L: Canadian Studies, Comparative Area Studies, Cultural Anthropology 184S, Economics 184S, History 184S, and Sociology 184S. One course. *Staff*

187S. Politics and the Libido (A). (SS) Effects of the libido on elite and mass political activities. Government regulation of sex-inspired behavior. C-L: Women's Studies. One course. *Paletz*

188. The Psychology of Political Symbols (A). (SS) The role of symbolic political issues in determining public attitudes and voting behavior. Symbolic political issues such as "law and order," pornography, and prohibition; distinguished from public welfare issues such as employment policies. C-L: Public Policy Studies 188. One course. *McConahay*

189, 190. Internship (A). Open to students engaging in practical or governmental work experience during the summer or a regular semester. To enroll, a student must obtain the approval of the director of undergraduate studies. A faculty member in the department will supervise a program of study related to the work experience, including an analytical paper on a politics-related topic. One course each. *Staff*

191, 192. Independent Study (A, B, C, or D). Directed reading and research. Open only to qualified juniors by consent of the director of undergraduate studies and of the supervising instructor. One course each. *Staff*

193, 194. Independent Study (A, B, C, or D). Directed reading and research. Open only to seniors by consent of the director of undergraduate studies and of the supervising instructor. One course each. *Staff*

196. American University Washington Semester. This number represents transfer credit for American Government and Politics or International Relations topics courses taken at American University in the Fall or Spring Washington Semester Program: Seminar I (one course), Seminar II (one course), Research Project (one course), Internship

(one course). Prior approval for admission into this program must be obtained from the director of undergraduate studies in political science. Four transfer credits.

A. Programs in American Government and Politics

D. Programs in International Relations

Four courses.

199. Special Topics in Government and Politics. (SS) Topics vary from semester to semester.

A. American Government and Politics

B. Comparative Government and Politics

C. Political Theory

D. International Relations

One course. *Staff*

For Seniors Only

200H. Senior Honors Program (A, B, C, or D). (SS) Consent of instructor required.

.01 Great Books in Political Science. One course.

.02 Senior Thesis Design, Research, Writing. One course.

.03 Senior Thesis Writing and Defense.

One course. Variable credit. *Staff*

200S. Senior Seminars. (SS) Open also, if places are available, to qualified juniors who have earned a 3.0 average and obtain the consent of the instructor.

A. American Government and Politics

B. Comparative Government and Politics

C. Political Theory

D. International Relations

One course. *Staff*

For Seniors and Graduates*

201S. Problems in International Security (D). (SS) Major security issues. Prerequisite: a course in international relations or American foreign policy. One course. *Lomperis*

202. American Foreign Economic Policy (D). (SS) Formulation and implementation of American foreign economic policy in the twentieth century. Topics include theories of foreign economic policy-making, commercial and monetary policy, energy and agricultural policies, trade and security, aid to developing countries, management of the debt crisis, foreign investment, the industrial policy debate, and multinational corporations and banks. One course. *Simmons*

203S. Issues in Politics and the Media in the United States (A). (SS) Research seminar analyzing significant questions in the relationship between politics and the media of communication. Consent of instructor required. C-L: Film and Video. One course. *Paletz*

205S. The Political Economy of Environmental Resources (B). (SS) The rational choice tradition (public goods, collective action, game theory, property rights, new institutionalism) as applied to environmental problems, resource exploitation, environmental justice, and the design of an environmentally sound society. One course. *McKean*

*The following courses may be taken by juniors who have earned a 3.0 average and obtained the consent of the instructor.

207S. American Constitutional Interpretation (A). (SS) U.S. Supreme Court interpretation of selected provisions of the Constitution. Prerequisites: Political Science 118 or 127 or 143 and consent of instructor. One course. *Fish*

208S. Analyzing the News (A). (SS) See C-L: Public Policy Studies 240S; also C-L: Film and Video. One course. *Paletz*

209. Problems in State Government and Politics (A). (SS) One course. *Staff*

210S. Models in International Relations (D). (SS) Emphasis on key theoretical concepts and modeling methodology beginning with basic game theory and decision theory. Such techniques are applied in analysis of deterrence, arms races, balance of power, hegemonic stability, and alliance formation. One course. *Niou*

213S. Theories of International Political Economy (D). (SS) Comparison and assessment of traditional and modern theories in terms of their logical and empirical validity. One course. *Grieco*

216S. Evolution of European Marxism (C-N). (SS) The central themes in the evolution of European Marxism: socialist thought prior to Marx; the writings of Marx and Engels. The themes are articulated in: Russian Marxism; Soviet Communism and its Marxist critics; the rethinking of Marx's political economy, the theory of the state, and concepts of class consciousness in the works of twentieth-century European Marxists. C-L: Comparative Area Studies. One course. *Coles*

217. Comparative and Historical Methods (B). (SS) See C-L: Sociology 214; also C-L: Comparative Area Studies. One course. *Gereffi, Janoski, Lin, Smith, or Tiryakian*

218. Political Thought in the United States (C-N). (SS) American political thought through the Civil War period. The Founders and their European antecedents. Debates over the Constitution, slavery, and the Union. One course. *Gillespie or Grant*

220S. Problems in International Politics (D). (SS) Prerequisite: one course in international relations, foreign policy, or diplomatic history. One course. *Holsti*

222. Introduction to Statistical Analysis (C-E). (QR) Basic applications of statistical theory to political questions: research design, hypothesis tests, computer data analysis. Consent of instructor required for undergraduates. One course. *Bianco, Brehm, or Gronke*

223. Ancient Political Philosophy (C-N). (SS) Intensive analysis of the political philosophy of Plato, Aristotle, and other ancient theorists. C-L: Classical Studies 203. One course. *Gillespie or Grant*

224S. Modern Political Theory (C-N). (SS) A historical survey and philosophical analysis of political theory from the beginning of the seventeenth to the middle of the nineteenth century. The rise of liberalism, the Age of Enlightenment, the romantic and conservative reaction, idealism, and utilitarianism. One course. *Grant or Spragens*

225. Topics in Comparative Government and Politics: Western Europe (B). (SS) Topics vary: the development of mass democracy and the welfare state; political and electoral participation and mobilization; social movements and political change; center-periphery conflicts; government and bureaucratic institutions and their relationships to society; the modern welfare state and political economy. C-L: Comparative Area Studies. One course. *Kitschelt or Lange*

227S. Issues in International Communications (B). (SS) Research seminar analyzing selected political issues in international communications. C-L: Film and Video. One course. *Paletz*

228S. Nineteenth- and Twentieth-Century Political Philosophy (C-N). (SS) Topics in nineteenth- and twentieth-century political philosophy, considering such authors as Hegel, Marx, Nietzsche, Kant, Fichte, Dostoevsky, and Heidegger. One course. *Coles or Gillespie*

229S. Contemporary Theory of Liberal Democracy (C-N). (SS) One course. *Spragens*

230S. Introduction to Positive Political Theory (C-E). (SS) Basic concepts of political economy, theory of preference and choice, social choice theory, and decision and game theory. One course. *Aldrich, Bianco, or Niou*

231S. Crisis, Choice, and Change in Advanced Democratic States (B). (SS) Contributions of Marx, Weber, and Durkheim toward analysis of modern democracies. Examination of selected contemporary studies using these three perspectives to highlight processes of change and crisis. Unsettling effects of markets upon political systems, consequences of bureaucratic regulation, and transformation of sources of solidarity and integration in modern politics. C-L: Comparative Area Studies. One course. *Kitschelt*

232. Political Economy: Theory and Applications (C-E). (SS) Selected topics. C-L: Comparative Area Studies. One course. *Lange*

233. Intermediate Statistical Methods (C-E). (QR) Applications of regression models of politics emphasizing the effect of assumptions behind Generalized Least Squares regression. Prerequisite: Political Science 222; consent of instructor required for undergraduates. One course. *Bianco, Brehm, or Gronke*

234S. Political Economy of Development: Theories of Change in the Third World (B). (SS) Alternative approaches to political economy and social change in the Third World. C-L: Comparative Area Studies, Cultural Anthropology 234S, History 234S, Interdisciplinary Course 234S, and Sociology 234S. One course. *Staff*

235S. Comparative Development of Islam (B). (SS) Comparative development of Islam in Indonesia, Malaysia, Pakistan, India, North Africa, and sub-Saharan Africa. A comparative analysis of the resurgence of Islam as a religious, political, and cultural force. C-L: Comparative Area Studies. One course. *Staff*

236S. Hegel's Political Philosophy (C-N). (SS) Within context of Hegel's total philosophy, an examination of his understanding of phenomenology and the phenomenological basis of political institutions and his understanding of Greek and Christian political life. Selections from *Phenomenology*, *Philosophy of History*, and *Philosophy of Right*. One course. *Gillespie*

238S. Development of United States Courts of the Fourth Circuit (A). (SS) Examines judges, courts, and law of United States district and old circuit courts and Court of Appeals: Maryland, Virginia, West Virginia, North Carolina, South Carolina, 1789-1958. One course. *Fish*

239. Comparative History and International Relations (D). (SS) Forces central to the practice of politics and international relations. Theoretical perspectives include those of Oswald Spengler, Schumpeter, Marx, Weber, and Aron as well as historical cases such as the Russian Revolution, the world wars, the Depression, and the nuclear era. One course. *Staff*

240. American Political Behavior (A). (SS) One course. *Staff*

244S. The Politics of the European Community (D). (SS) Historical, theoretical, and analytical treatment of reform and renewal of the European Community: trade, finance, economic and technological relationships. Impact of European Community development on international relations and American foreign policy. One course. *Grieco*

245. Ethics and Policy-Making (C-N). (SS) Not open to students who have taken Public Policy Studies 116. See C-L: Public Policy Studies 223. One course. *Rapaport*

247. Politics and Philosophy of Self and Other (C-N). (SS) Epistemological, ontological, ethical, and political dimensions of relations between self and other. Theorists may include Husserl, Merleau-Ponty, Levinas, Derrida, Adorno, Gadamer, Sartre, Foucault, and Bakhtin. One course. *Coles*

248. The Politics of the Policy Process (A). (SS) See C-L: Public Policy Studies 219. One course. *Ascher, Mayer, or Miller*

249. The Politics of Health Care (A). (SS) See C-L: Public Policy Studies 253. One course. *Sprinkle*

250S. International Security after the Cold War (D). (SS) Contemporary issues in international security: nuclear proliferation, balance of power, the role of force, alternative viewpoints. Consent of instructor required. One course. *Feaver*

253S. Comparative Government and the Study of Latin America (B). (SS) Current literature on major themes of Latin American politics. C-L: Comparative Area Studies. One course. *Archer*

254S. Essential Global Democracy (A). (SS) The failure and success in establishing real democracy, including focus on the main leaders. Issues of law, rights, equality, representation, reasoning, and other principles addressed in the context of practical politics. One course. *Barber*

255. Political Sociology (B). (SS) See C-L: Sociology 255; also C-L: Canadian Studies. One course. *Smith or Tiryakian*

256S. Arms Control and National Security Policy (D). (SS) The evolution of nuclear weapons and strategy and of global defense policy toward the Soviet Union and other adversaries; the arms control process and nonproliferation. Consent of instructor required. One course. *Lomperis*

257S. Making American Defense Policy (D). (SS) Theory and practice of politics of national security in the United States. One course. *Feaver*

258. Global Interdependence. (SS) Historical, cultural, political, economic, and technological factors underlying increasing global interdependence. Different forms interdependence can and has taken. Earlier forms of interdependence and the events that shaped their development and destruction. Topics covered include the transmission of technological innovation and of new diseases as well as the rise of economic regionalism and how modern states have organized their responses. Open to seniors and graduate students including those in the professional schools. One course. *Aharoni and staff*

260S. The Tradition of Political Inquiry (C-N). (SS) Past and present problems, goals, presuppositions, and methods. One course. *Spragens*

262S. International Communism (B). (SS) C-L: Comparative Area Studies. One course. *Hough*

265S. The Process of International Negotiation (D). (SS) See C-L: Public Policy Studies 265S; also C-L: Canadian Studies. One course. *Mayer*

266S. Comparative Social Policy (B). (SS) See C-L: Public Policy Studies 266S; also C-L: Comparative Area Studies. One course. *Smith*

267S. Policy-Making in International Organizations (D). (SS) See C-L: Public Policy Studies 267S. One course. *Ascher*

270S. Fundamentals of Political Economy (C-E). (SS) Application of economic reasoning to the study of politics. Analysis of campaigns and elections; legislatures; and the regulation of industries. C-L: Economics 280S. One course. *Aldrich, Bianco, or Niou*

274S. Seminar in Urban Politics and Urban Public Policy (A). (SS) A probing of topical issues in both their theoretical antecedents and their contemporary manifestations. The intellectual debates and scholarly treatments surrounding issues of power in the city, urban redevelopment policy, urban poverty, and race in the city. One course. *Orr*

275. The American Party System (A). (SS) An intensive examination of selected facets of American national political parties, such as relationships between presidential and congressional politics, the politics of national conventions, recent foreign policy and party alignments, and the controversy over party government. One course. *Staff*

277. Comparative Party Politics (B). (SS) The impact of social and political systems on party structures, functions, ideologies, and leadership recruitment. Emphasis upon research techniques and objectives. C-L: Canadian Studies and Comparative Area Studies. One course. *Lange*

279S. Political Protest and Collective Mobilization (B). (SS) Survey of theories, methods, and empirical studies of political mobilization outside institutional channels; protest behavior and strategies; responses of the state to these challenges; the success of collective mobilization. Emphasis on comparative analyses of protest in advanced industrial democracies. One course. *Kitschelt*

282S. Canada (B). (SS) See C-L: History 282S; also C-L: Canadian Studies, Comparative Area Studies, Cultural Anthropology 282S, Economics 282S, Interdisciplinary Course 282S, and Sociology 282S. One course. *Staff*

284S. Public Policy Process in Developing Countries (B). (SS) See C-L: Public Policy Studies 284S; also C-L: Comparative Area Studies. One course. *Ascher*

299. Advanced Topics in Government and Politics. (SS) Topics vary from semester to semester.

- A. American Government and Politics
 - B. Comparative Government and Politics
 - C. Political Theory
 - D. International Relations
- One course. *Staff*

COURSES CURRENTLY UNSCHEDULED

112S. Shaping the News (A). (SS)

113. International Political Economy (D). (SS)

114. Public Opinion (A). (SS)

116S. The Small Democracies in Europe (B). (SS)

129. Political Participation (A). (SS)

149. United States and East Asia (D). (SS)

150. The Individual and Society: The Classical View (C-N). (SS)

152. Political Mobilization of the American Public (A). (SS)

161S. Comparative Government and Politics: Africa (B). (SS)

163. Gender, Politics, and Policy: The Third World Case (B). (SS)

- 169. **Politics in Revolutionary China (B). (SS)**
- 183D. **Hellenistic Philosophy (C-N). (CZ)**
- 186. **Political Leadership (A). (SS)**
- 195. **Comparative Political Behavior in the United States and Canada (B). (SS)**
- 204S. **Ethics in Political Life (C-N). (SS)**
- 211S. **Current Problems and Issues in Japanese Politics (B). (SS)**
- 212S. **Domestic Structures and Foreign Policies of Advanced Democratic States (D). (SS)**
- 214S. **The Politics of Scarcity (B). (SS)**
- 215S. **Philosophical Bases of Political Economy and Society (C-E). (SS)**
- 219S. **Film and Politics (A). (SS)**
- 221S. **International Institutions and the World Political Economy (D). (SS)**
- 226S. **Theories of International Relations (D). (SS)**
- 237S. **Comparative Public Policy (B). (SS)**
- 241S. **The Political Thought of Asia from Manu to Mao (C-N). (SS)**
- 243S. **Political Applications of Game Theory (C-E). (SS)**
- 246S. **Political Hypocrisy and Idealism (C-N). (SS)**
- 251S. **The American Presidency (A). (SS)**
- 252S. **The Nation-State and the International System (D). (SS)**
- 259S. **Low Intensity Conflict and the Lessons of Viet Nam (D). (SS)**
- 261. **Politics and the Future (D). (SS)**
- 263S. **Methods of Political Science (C-E). (SS)**
- 268. **The Regulatory Process (A). (SS)**
- 280S. **Comparative Government and Politics: Sub-Saharan Africa (B). (SS)**
- 283S. **Congressional Policy-Making (A). (SS)**
- 293. **Federalism (B). (SS)**

POLITICAL INTERNSHIPS

The department administers an internship program, primarily in Washington, D.C., for political science majors and interested nonmajors. Students participate by qualifying for a position obtained by the department or by acquiring their own relevant employment, with or without compensation. Course credit can be obtained by enrolling in Political Science 189 or 190 and writing an analytical paper on a politics-related topic. Potential applicants should contact the internship director, Louise Walker (339 Perkins), at any time, but preferably in the fall semester.

POLITICAL SCIENCE COURSES BY FIELDS

Political science courses for undergraduates are offered in four fields. The courses in each of the four fields are listed below; in the course descriptions above, the field in which each course falls is indicated by the appropriate symbol (A, B, C-N/C-E, or D).

Students majoring in the department must complete at least one course in each of three fields.

American Government, Politics, and Public Administration (A). Political Science 49S,* 91, 91D, 100D, 101A,S, 103, 108, 109, 110, 112S, 118, 127, 128, 129, 130S, 137, 141, 143, 145, 146, 152, 154, 164, 174S, 186, 187S, 188, 189, 190, 191,* 192,* 193,* 194,* 196, 197S-198S,* 199A, 200A,S, 203S, 207S, 208S, 209, 219S, 238S, 240, 248, 251S, 268, 274, 275, 283S, 299A.

Comparative Government and Politics (B). Political Science 49S,* 92, 92D, 98, 100B, 100C, 100D, 100E, 100F, 100H, 101B,S, 102, 105, 107, 111, 115, 116S, 117, 125, 132, 135, 136, 151, 153, 155, 161S, 162, 163, 165, 169, 171, 173S, 176A, 176B, 180, 184S, 191,* 192,* 193,* 194,* 195, 197S-198S,* 199B, 200B,S, 205S, 211S, 214S, 217, 225, 227S, 231S, 234S, 235S, 237S, 249, 253S, 255, 262S, 266S, 277, 279S, 280S, 282S, 284S, 293, 299B.

Political Theory: Normative (C-N). Political Science 49S,* 94, 94D, 101C,S, 104, 123, 126, 131, 140, 150, 159, 179, 181, 182, 183D, 191,* 192,* 193,* 194,* 197S-198S,* 199C-N, 204S, 215S, 216S, 218, 223, 224S, 228S, 229S, 241S, 245, 246S, 247, 260S, 264S, 299C-N. **Empirical and Methodology (C-E).** Political Science 138, 139, 168, 191*, 192*, 193*, 194*, 197S-198S*, 199C-E, 215S, 222, 230S, 232, 233S, 243S, 263S, 270S, 299C-E.

International Law, Relations, and Politics (D). Political Science 49S,* 93, 93D, 100C, 100G, 106, 113, 120, 121, 122, 124, 133, 134, 142, 144, 147, 149, 156, 157, 158, 160, 166, 167, 170, 191,* 192,* 193,* 194,* 197S-198S,* 199D, 200S,D, 201S, 202, 206, 210S, 212S, 213S, 220S, 221S, 226S, 239, 244S, 250, 252, 256S, 257S, 259S, 261, 265S, 267S, 299D.

THE MAJOR

Requirements. Eight courses in political science including (1) at least one course in each of three fields; (2) at least one course at Duke at the 200-299 level; and (3) no more than three cross-listed courses originating outside the Department of Political Science.

Of the eight required political science courses, at least six must be taken at Duke to meet major requirements. However, only five Duke political science courses need be taken if the student: (1) is transferring courses from a year-long approved study abroad program; or (2) transferred to Duke after completing two undergraduate years at another institution; or (3) completed one semester at an approved study abroad program and one semester in the Washington Semester Program at American University. For the purpose of this requirement courses in the Washington Semester Program at American University (Political Science 196, I- IV) will be counted as transfer courses.

Advanced Placement Credit. Advanced placement credits in political science (score of 4 or 5). These course credits are designated as Political Science 90A (American Government and Politics) and Political Science 90B (Comparative Government and Politics). Such credits are applied toward the thirty-four credits needed for graduation and enable students to enroll in any 90-level introductory course(s) and permit them to enroll in advanced American and/or Comparative Government course(s). Advanced placement course credits (90A, 90B) do not satisfy course requirements for the political science major.

Suggested Work in Related Disciplines. Selected courses in such disciplines as anthropology, economics, history, philosophy, psychology, public policy, religion, and sociology are desirable.

Honors/Distinction. The department offers students majoring in political science a senior honors program, by successful completion of which a participant achieves graduation with distinction in political science. The central requirement of the program is an honors thesis which the student prepares under faculty supervision. The honors program consists of three courses. The prerequisite is Political Science

*If subject matter is appropriate to the field.

200H.01 (Great Books in Political Science), usually taken in the second semester of the junior year. This course is open to all juniors and seniors, but registration priority is accorded those juniors who are qualified candidates for admission into the Senior Honors Seminar (Political Science 200H.02). Seniors entering their seventh semester who have attained at least a 3.3 grade point average overall and a 3.5 average in political science courses are eligible for admission to this seminar. Also eligible for admission are any other entering seventh-semester seniors who have performed in Political Science 200H.01 to the satisfaction of the instructor. Upon request, that instructor may recommend admission to the honors seminar of a student who lacks one or both requisite grade point averages. The program director must approve any recommended student's admission.

Qualified juniors will be invited during the fall semester of their junior year to enroll in Political Science 200H.01 to be offered during the ensuing spring semester. Interested students will review their academic plans with the program director for permission to enroll in a course examining leading political science literature. Political Science 200H.02, a seminar usually taken in the fall of the senior year, is devoted to development of the honors thesis and includes close supervision of the writing stage of the project by a faculty supervisor selected by the student. Continued close faculty supervision of the project occurs in Political Science 200H.03, which is an independent study course.

Completion of the thesis, its evaluation, and its defense before a three-member faculty committee warrants graduation with distinction in political science if a grade of A- or better is assigned to the student's thesis and performance in Political Science 200H.02 and 200H.03. The intradepartmental concentration option is partially satisfied by successful completion of the two-course senior honors thesis seminar. Further information may be obtained from the Honors Program director or from the director of undergraduate studies.

Latin Honors by Honors Project. A major in political science who wishes to be a candidate for Trinity College Latin honors by honors project must: (1) have an overall grade point average of 3.5 in political science at the commencement and termination of the project, (2) enroll in and successfully complete the Senior Honors Program (Political Science 200H.01, .02, .03), (3) provide written notice to the faculty director of that program and to the director of undergraduate studies of an intention to seek Latin honors. Following the candidate's oral defense of the honors thesis, the three-member examination committee, which has determined that the candidate merits graduation with distinction in political science, will evaluate the candidate's eligibility for any level of Latin honors. The director of the Senior Honors Program, who also serves as a member of the Undergraduate Affairs Committee of the Department of Political Science, will so advise the committee. If the candidate is deemed to be eligible for Latin honors by honors project, that committee will evaluate the candidate's performance in the honors program and his or her overall academic performance in the major and in the full course of study at Duke, and, if warranted, will certify such candidate for a specific level of Latin honors.

Psychology (PSY)

Faculty in Psychology—Experimental: Professor Lockhead, *Chair*; Professor R. Erickson, *Director of Undergraduate Studies*; Professors Brodie, Eckerman, C. Erickson, W. G. Hall, Holland, Rubin, Staddon, M. Wallach, and Wolbarsht; Associate Professors Kuhn, Marsh, Meck, Schmajuk, and Williams; Assistant Professors Needham and Nowicki; Professors Emeriti Bevan, Diamond, Kimble, Kremen, H. Schiffman, and Wing; Assistant Professor of the Practice Conley; Research Professors Crovitz, W. C. Hall, S. Schiffman, and L. Wallach; Assistant Research Professors Higa, D. Smith, and Swithers; Adjunct Assistant Professor Izard

Faculty in Psychology—Social and Health Sciences: Professor Costanzo, *Chair*; Associate Professor Putallaz, *Director of Undergraduate Studies*; Professors Bettman, Blumenthal, Brodie, Carson, Coie, Craighead, George, Hamilton, Hasher, Martin Lakin, Maddox, Payne, Roth, Sheppard, Surwit, Thompson, Vidmar, and Williams; Associate Professors Anderson, Curry, Day, Gil, Keefe, Linville, Lochman, Logue, and Spenner; Assistant Professors Emery, Fischer, Fredrickson, March, Mazuka, and Serra; Professors Emeriti Alexander and Borstelmann; Assistant Professors of the Practice Musia Lakin and Terry; Research Professor Goldstein; Associate Research Professor Madden; Research Scholar Fairbank

A major is available in this department.

The major in psychology is cooperatively administered by the Department of Psychology: Experimental and the Department of Psychology: Social and Health Sciences. Faculty with appointments in both departments are listed only in their primary department. The director of undergraduate studies in either department guides all majors and all students interested in any psychology courses. However, Dr. Putallaz (director of undergraduate studies, social and health sciences) has primary responsibility for the personality and social and health tracks of the major, and Dr. R. Erickson (director of undergraduate studies, experimental) has primary responsibility for the biological and cognitive tracks of the major; either may be consulted by students with interests in the developmental track.

The *General Courses*, coded (G), apply as indicated. The *Biological Bases of Behavior* area, coded (B), includes courses on the nervous system, the learning process, motivation, neurochemistry, hormones, and other biological factors in their relationship to behavior. The *Cognitive Psychology* area, coded (C), includes the topics of sensation and perception, cognition, learning, language, memory, and psycholinguistics. *Developmental Psychology*, coded (D), emphasizes the developmental aspects of all psychological processes such as sensory and motor behavior, cognition, children's thinking and reasoning, and social behavior. *Health Psychology*, coded (H), involves study of behavioral implications of illness and health. The courses involve understanding sources and treatment of psychopathology due to stress, trauma, and disease. Courses in the *Personality/Social Psychology* area, coded (P), ultimately bear on the questions of human character and behavior, both normal and abnormal. These include personality, social and abnormal issues, along with strategies for the prevention of deviance.

11. Introductory Psychology (G). (SS) Biological bases of behavior, psychological development, cognitive psychology, personality, abnormal behavior, and social psychology. Designed as a broad introduction to psychology for nonmajors as well as majors; not required for the major. Students are expected to participate as subjects in three to six hours of psychological research. One course. *Holland or H. Schiffman*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

103. Biological Bases of Behavior: Introduction and Survey (B). (NS) Physiological, developmental, and evolutionary approaches to behavior. Sensory and cognitive processes, sleep, pain, emotion, hunger, and thirst as well as maternal and sexual behavior patterns. Students required to participate as subjects in three to six hours of psychological research if not done in a previous introductory class. Prerequisite: Biology 19, Biology 21L, or Biology 22L; may be taken concurrently. One course. *C. Erickson or staff*

105. Developmental Psychology: Introduction and Survey (D). (SS) Theory and research on growth and behavior from infancy to adolescence. Students required to participate as subjects in three to six hours of psychological research. One course. *Goldstein, Mazuka, Needham, Putallez, or staff*

107. Cognitive Psychology: Introduction and Survey (C). (SS) Overview of cognitive processes including pattern recognition, concept formation, attention, memory, imagery, language, problem solving, and thinking. Emphasis both empirical and theoretical. Students required to participate as subjects in three to six hours of psychological research. One course. *Day, Hasher, or Rubin*

108. Personality and Social Behavior: Introduction and Survey (P). (SS) The determinants of socially significant human behavior—those residing in the person, those that are the product of interpersonal context, and those resulting from the interaction of both sources. Formative as well as contemporary influences considered. Students required to participate as subjects in three to six hours of psychological research. One course. *Carson, Costanzo, or Fredrickson*

109. Health Psychology: Introduction and Survey (H). (SS) The role of behavioral variables in the etiology, pathophysiology, and treatment of cardiovascular disease and endocrine disorders; psychoneuroimmunology; chronic pain; and life style behaviors with health consequences such as smoking and eating disorders. Students required to participate as subjects in three to six hours of psychological research if not done in a previous introductory class. One course. *Anderson and Gil*

110. Applied Psychology (P). (SS) Applications of psychology to problems of personnel selection, industrial efficiency, advertising, and selling. Prerequisite: Psychology 117 or equivalent. One course. *Staff*

111. Learning and Adaptive Behavior (B, C). (NS) Principles of instrumental learning in animals and humans. Prerequisite: none, but some knowledge of quantitative science desirable. One course. *Higa*

112. Sensation and Perception (C). (SS) Principles of organization of perceptual systems, including sensory systems (vision, audition, proprioception, and chemical senses); pattern recognition; perceptual anomalies; attention; methods of measurement. One course. *Lockhead*

114. Personality (P). (SS) Representative theories of personality from Freud to the present, emphasizing problems of normal personality structure, dynamics, development, and assessment. One course. *Staff*

115. Introduction to Learning Theory (C). (SS) Simple processes of learning, memory, and motivation, primarily nonhuman, from the perspectives of associationism, ethology, and cognitive science. One course. *Holland*

116. Social Psychology (P). (SS) Problems, concepts, and methods in the study of social interaction and interpersonal influence. C-L: Sociology 106 and Women's Studies. One course. *Costanzo, Fischer, or George*

117. Statistical Methods (G). (QR) Elementary statistical techniques and their application to the analysis and interpretation of social science data. Theory of inference is stressed. C-L: Sociology 133. One course. *Staff*

118. The Psychology of Individual Differences (B, C, D, P). (SS) Nature and causes of individual and group variations in intelligence, special abilities, social and emotional characteristics. Prerequisite: Psychology 117 or equivalent. One course. *Staff*

119. Abnormal Psychology (H, P). (SS) Disordered behavior and constructive personality change viewed in interpersonal and social context for purposes of understanding normal and abnormal personality development and functioning. One course. *Carson or Craighead*

120. Comparative Psychology (B). (SS) A survey of animal behavior from the psychologist's perspective. One course. *Holland*

121. Early Cognitive Development (C, D). (SS) Perceptual and conceptual development in humans from birth through early childhood. Topics include how infants and young children perceive the world, how they acquire knowledge about the world, and how they remember and use this knowledge over time. Prerequisite: Psychology 105. One course. *Needham*

123. Introduction to Human Memory (C). (SS) A review of the theoretical and empirical study of the encoding, storage, and retrieval of information. The development, pathology, and computer modeling of memory in clarification of basic process and applications. One course. *Hasher or Rubin*

124. Human Development (D). (SS) Especially for sophomores. Juniors and seniors by consent only. See C-L: Interdisciplinary Course 124; also C-L: Human Development and Sociology 124. One course. *Anderson, Gustafson, and staff*

125. Memory and the Brain (B). (NS) Brain function in relation to the phenomenon of memory. Historical and current perspectives. One course. *Swartzwelder*

126. Behavior and Neurochemistry (B, P). (NS) The role of brain chemicals (neurotransmitters, peptides, and hormones) in behavior. Hypotheses addressing the neurobiology of mental disorders. Prerequisite: Psychology 103. One course. *Cooper*

127. Drugs, Brain, and Behavior. (NS) Mechanisms by which psychoactive drugs act. Changes which occur with chronic use of drugs; drug abuse and dependence. Social and legal implications of psychoactive drugs. Prerequisites: introductory biology (Biology 21L, 22L) and chemistry (Chemistry 11L, 12L). C-L: Pharmacology 160. One course. *Kuhn*

128. Memory Disorders (C). (SS) Examines human memory disorders and their implications for cognitive theory practice. Topics include specific disorders such as head injury and Alzheimer's disease; memory complaints in normal people; and mnemonics and other methods used to bypass poor memory ability. Psychology 107, 123, or other courses in cognitive psychology are recommended as background for this course. One course. *Crovitz*

129. Psychology and the Law (P). (SS) The relationship between psychology and the legal system. Theory, empirical findings, and court cases in mental health law, including the insanity defense, competency to stand trial, and civil commitment. Use of social science data in several legal domains, including expert testimony in rape and domestic assault trials, employment discrimination, and trademark infringement. Prerequisite: Psychology 108 or Psychology 116. One course. *Fischer*

130. Psychosocial Aspects of Human Development (D). (SS) The connectedness of societal, behavioral, and biological components of normal development from childhood through old age; society as the context in which individuals develop over the life span. Introductory work in anthropology, psychology, or sociology recommended. C-L: Human Development, Interdisciplinary Course 180, and Sociology 169. One course. *Martin Lakin and Maddox*

131. Early Social Development (D). (SS) The developmental course of children's social behavior. The role that certain relationships (for example, mother, father, siblings, peers, friends) play in that development as well as the effects of other influences (for example, school, television, divorce, daycare). Prerequisite: Psychology 105. One course. *Putallaz*

132. Cognitive Aspects of Human Development (C, D). (SS) The development of mind and its relation to other aspects of human development. Development of visual and auditory perception, language, memory, concepts, problem solving, academic

skills, social cognition, and cognition and culture. Prerequisite: one course in psychology. One course. *Mazuka*

133. Fundamental Issues in the Study of the Brain (B). (NS) Classic papers in the fields of systems, developmental, cellular, and molecular neurobiology. Prerequisite: Psychology 135. One course. *W. C. Hall*

134. Psychology of Language (C). (SS) Psychological "reality" of linguistic structures, language and cognition, biological bases, animal communication, language pathologies, nonverbal communication, language versus music, linguistic universals, and bilingualism. Everyday language phenomena (for example, slips of the tongue) as well as the experimental and theoretical literature. Psychology 107 desirable. C-L: Linguistics. One course. *Day*

135. Principles of Neurobiology (B). (NS) Prerequisites: Biology 21L and 22L, and Chemistry 12L or equivalent. See C-L: Biology 154. One course. *Nowicki*

136. Developmental Psychobiology (D). (SS) Early human social development, including the formation of social relationships, the origins of altruism and aggression, sex differences, peer relationships, and verbal and nonverbal communication patterns. Prerequisite: Psychology 103, 105, or consent of instructor. One course. *Eckerman*

137. Adolescence (D). (SS) Adolescent development, including identity formation, intelligence, sexuality, peer and parent relationships, vocational choices, drugs, and psychopathology. Theory and empirical findings. One course. *Goldstein*

138. Language Development (C, D). (SS) Survey of language development. First language acquisition (phonology, syntax, and semantics), issues in second language acquisition and bilingualism, chimpanzee studies, and language pathology. Examined in a theoretical framework of Chomskian innate language faculty, as well as in a framework which emphasizes the role of pragmatics and communicative skills. Prerequisite: one course in developmental or cognitive psychology. C-L: Linguistics. One course. *Mazuka*

139. Psychobiology of Motivation (B, D). (NS) The psychobiology of such concepts as motivation, drive, incentive, reward, and goal-directed behavior. The neural mechanism; developmental perspectives. Prerequisite: Psychology 103. One course. *Mulvey*

140S. Research Methods in Developmental Psychology (D). (SS) Prerequisite: Psychology 105 or consent of instructor. One course. *Eckerman or L. Wallach*

141S. Tests and Measurements (B, C, D, P). (SS) Test methods used by psychologists to measure and evaluate mental processes. Prerequisite: Psychology 117 or equivalent. One course. *Terry*

142S. Child Observation (D). (SS) Observation of children in the group setting of the University Preschool and Primary Program. Aspects of personality, social development, and child-adult relationships. Open only to junior and senior psychology majors with consent of instructor. One course. *Musia Lakin*

143S. Cognition Laboratory (C). (SS) Human cognition; language, memory, problem solving, and other higher mental processes. Prerequisite: Psychology 107 or 112 or 123. One course. *Hasher, Lockhead, Rubin, or Serra*

145S. Experimental Approaches to Personality (P). (SS) Methods applied to personality research. Prerequisite: one course in psychology. One course. *M. Wallach*

146S. Research Methods in Health and Clinical Psychology (H). (SS) Contemporary approaches to psychologically based research in health and mental health. Survey,

laboratory, and/or narrative self-report methodologies. Class research projects. Prerequisites: Psychology 108, 116, or 119, and Statistics 110. One course. *Blumenthal and Keefe*

147S. Experimental Social Psychology (P). (SS) Group dynamics, attitude change, and interpersonal perception. Prerequisite: Psychology 116. One course. *Fredrickson*

148S. Perception Laboratory (C). (SS) Experimental approaches to basic phenomena of perception as determined by conditions in the external situation and the person: biological and psychological. Prerequisite: Psychology 112 or consent of instructor. One course. *Lockhead*

149S. Methods in Behavioral Neurobiology (B). (NS) Research in neural bases of behavior using simple biological systems as models for more complex behavior. Laboratory experience in experimental methodologies. Observational techniques in study of natural behaviors and neurophysiological recording and stimulation. Prerequisites: Psychology 103 or background in biology, and consent of instructor. One course. *W. G. Hall or Mulvey*

150S. Hormones and Behavior (B, P). (NS) The endocrine basis of sexual, aggressive, parental, communication, and feeding behaviors. Prerequisite: Psychology 103 or biological background. C-L: Women's Studies. One course. *Izard*

151S. Child Clinical Psychology (D, P). (SS) Theories of clinical intervention with children and families; research on prediction of adult disorders from childhood problems, evaluation of therapy and epidemiological data. Prerequisites: Psychology 105 and 119. One course. *Staff*

152S. Community Psychology (D, P). (SS) Community problems and their possible solutions through observation in various community settings involving children, primarily in the Durham City Schools. Consent of instructor required. One course. *Staff*

154S. Education, Children, and Poverty (D). (SS) Psychological hypotheses concerning the roles of preschool intervention programs, improved quality of resources, teacher expectancy effects, and enhancement of pupil self-confidence in relation to the goal of improved cognitive competence for poverty background children. Criteria for defining competence, such as scores on psychometric intelligence tests, performing on Piagetian tasks, and development of specific skills. Interpretations concerning intelligence and cognitive deprivation in poor children in light of relevant psychological evidence. Prerequisite: one course in psychology or consent of instructor. One course. *M. Wallach*

157S. Life Span Analysis of Social Relationships (D). (SS) The developmental changes that occur in social relationships (for example, parent, sibling, peer) across the life span; the differing roles these relationships play in the development of the individual. Prerequisite: Psychology 105. One course. *Putallaz*

158S. Sleep Seminar (B). (NS) Explores the phenomena of sleep over the full range of biological and psychological aspects. Function of sleep and consequences of sleep loss and change. Sleep disorders. Prerequisite: Psychology 103. One course. *Marsh*

159S. Biological Psychology of Human Development (B, D, H, P). (SS) Multidisciplinary perspectives bearing on key processes in human development from infancy through old age; the way that biological and psychological processes act together in normal and pathological behavior and development. Clinical case material and videotapes. Preference given to senior psychology majors and to students in the Program in Human Development. Consent of instructor required. One course. *Thompson*

162S. Clinical Issues: Conceptions, Techniques, and Problems of Professional Clinical Psychology (H, P). (SS) Assessment of personality and psychopathology.

Consultation and psychotherapy in individuals, groups, family, and organizational contexts. Research on clinical questions. Intended for those contemplating advanced graduate or professional study and careers in clinical psychology, counseling, psychiatry, social work, or cognate fields. Prerequisites: junior or senior status and consent of the instructor. One course. *Martin Lakin*

164S. Psychology of Women (P). (SS) The psychology of women in this country: development, including sex differences, separation and individuation, and achievement; sexuality; sex-roles; mental health problems particularly salient to women; cultural influences on female development; and views within the field of psychology about women. Consent of instructor required. C-L: Women's Studies. One course. *Hamilton or Roth*

165S. Neurobiology of Learning and Memory (B). (NS) Readings in the neurophysiological and neurochemical underpinnings of the memory process. Current and classical research and review articles. Prerequisite: Psychology 103. One course. *Swartzwelder*

167S. Brain Mechanisms of Behavior (B, C). (NS) General physiological principles of brain organization in relation to behavioral processes from sensation to concept formation. Discussions of original readings from seminal papers in the early nineteenth century to the present. Prerequisite: Psychology 103. One course. *R. Erickson*

168S. Different Worlds of Hearing (B). (NS) Sensory and perceptual adaptations by species to facilitate processing of stimuli. A comparative study of the relations between specialized auditory perceptual mechanisms found in different species and the acoustic environment which ostensibly produced these unique adaptations. Prerequisite: Psychology 103. One course. *Smith*

169S. Eating Behavior and Disorders (B). (SS) The interaction of taste and smell with obesity, anorexia, and nutritional status including that of the elderly. Prerequisite: Psychology 103. One course. *S. Schiffman*

170S, A-R, U-Z. Selected Problems. New courses not yet in the bulletin are designated as 170S or 270S depending on their level. Since all faculty offer these courses, their contents vary accordingly. Different courses indicated by the letter. One course. *Staff*

171T, A-R. Tutorials. Small group discussions about influential books and articles in psychology. The availability of tutorials, their content, and the instructors will be announced before registration. Consent of instructor required. Pass/fail grading only. Half course. *Staff*

173S. Theoretical Issues in General Psychology (C, D, P). (SS) In-depth consideration of certain issues that cut across different areas of psychology: Are human beings bound to act in their own interests, or can they be genuinely altruistic? What do we mean when we talk about the mind or mental states, how do we know about these states in others as well as ourselves, and how are these states related to the body? Is psychology a science? Should it try to be, can it be, a science? One course. *L. Wallach*

174S. Computational Models and Perception (C). (SS) Relations between perception (including, for example, visual illusions and size constancy) and recent computer models. One course. *Crovitz and Lockhead*

175S. Psychophysiology (B). (NS) How emotional and cognitive processes are expressed physiologically, and how this can be used to understand how the brain works. Special attention given to how electrical activity of the brain is related to memory, selective attention, and decision making. Prerequisite: Psychology 103 or background in biology. One course. *Marsh*

177S. Human Sexuality (B). (NS) The biological, endocrinological, and physiological correlates of human sexual behavior including sexual differentiation, pubertal development, adult male and female sexual behavior, premenstrual syndrome, menopause, sexuality and aging, homosexuality, and deviant sexual behavior. Prerequisite: Psychology 103 or background in biology. One course. *Izard*

189S. Building the Brain. (NS) Recommended background: Psychology 103, Biology 154, Biology 21L and/or Biology 22L. Open only to juniors and seniors. See C-L: Distinguished Professor Course 189S; also C-L: Human Development, Neurobiology 189S, and Neurosciences. One course. *Purves*

191, 192, 193, 194. Independent Study. Directed reading and research. 191, 192: junior year fall, spring; 193, 194: senior year fall, spring. Consent of instructor and director of undergraduate studies required. One course each. *Staff*

For Advanced Undergraduates and Graduates

202S. Autobiographical Memory (C). (SS) A review and critical analysis of the literature, theory, and empirical study of autobiographical memory within cognitive psychology. Consent of instructor required. One course. *Rubin*

203S. Sensation and Perception (C). (SS) Classical and current concepts and methods. Consent of instructor required. One course. *Lockhead*

204S. Great Ideas in Psychology (C). (SS) Ideas in psychology drawn from various content areas (for example, perception, personality, motivation, biological bases, social, cognitive, developmental, learning, clinical) and various methodological approaches (for example, experimental, introspection, observation, interview, longitudinal, simulation). Prerequisites: must be a junior or senior psychology major and have consent of instructor, or have graduate status. One course. *Day*

205S. Children's Peer Relations (D). (SS) An examination of the empirical literature with emphasis on the functions that peers serve for children, the developmental course of these relationships, the clinical ramifications and possible explanations for inadequate peer relations (including an examination of the family's role), and interventions used to improve children's relationships with their peers. Consent of instructor required. One course. *Putallaz*

206S. Pediatric Psychology (H). (SS) The conceptual and methodological bases for the field. Case material illustrating how developmental, biological, and psychosocial processes act together in child health and illness. Focus on adjustment and coping with illness and treatments related to cystic fibrosis, sickle cell disease, cancer, diabetes, and seizure disorders. Consent of instructor required. One course. *Thompson*

207S. Topics in Psychobiology (B, H). (NS) The biological substrates of human behavior in health and disease. Drug abuse, alcoholism, depression, schizophrenia, and human aggression. Films and videotapes. Student presentations; patient interviews. Prerequisites: senior standing and consent of instructor. C-L: Distinguished Professor Course 207S. One course. *Brodie*

208S. Emotion (P). (SS) An analysis of theoretical and empirical approaches to understanding emotions, with an emphasis on the functions emotion serves in people's lives. Both classic and contemporary research literatures. Prerequisites: Psychology 108 and consent of instructor. C-L: Women's Studies. One course. *Fredrickson*

209S. The Cognitive Psychology of Oral Traditions (C). (SS) The structure of songs and genres from oral traditions and the processes used in their composition, transmission, and recall, analyzed from the perspective of cognitive psychology. Consent of instructor required. One course. *Rubin*

210S. Cognition (C). (SS) Schematic view of cognitive psychology plus intensive study of two to three specific research topics such as forms of representation, individual differences, and problem-solving models. Emphasis on alternative experimental and theoretical approaches. Prerequisites: Psychology 107 and consent of instructor, or graduate status. One course. *Day*

212S. Human Memory (C). (SS) Classical and modern literature, data, and theories relating to mechanisms of information processing, storage, and retrieval. Prerequisite: consent of instructor or graduate status. One course. *Hasher or Rubin*

214S. Development of Social Interaction (D, P). (SS) Major concepts and methods pertaining to early social development, emphasizing human social behavior and a developmental psychobiological approach. Consent of instructor required. One course. *Eckerman*

218S. Personality, Stress, and Disease (H, P). (SS) The interaction between person and social environment as a contributor to development of physical disease. Both epidemiological and laboratory-based research considered. Prerequisite: Psychology 109, consent of instructor, or graduate status. One course. *Williams*

227S. Behavioral Physiology: Basic Systems (H, P). (SS) Organ systems review of physiology, emphasizing the role of the central nervous system and behavior in physiological function. Prerequisites: for undergraduates—consent of instructor and Psychology 103 or 159S. One course. *Surwit*

228S. Behavioral Physiology: Stress and Disease (H, P). (SS) Physiological processes involved in stress and coping; effects on nervous, cardiovascular, immune, and endocrine systems; how stress influences various disorders, that is, depression, cardiovascular disease, and diabetes. Prerequisites: for undergraduates—consent of instructor; Psychology 121, 159S, and 227S. One course. *Surwit*

230S. Social Behavior of Animals (B, D, P). (NS) Developmental, ecological, and physiological aspects of territorial, sexual, parental, and aggressive behavior. Consent of instructor required. One course. *C. Erickson*

234S. Advanced Personality (P). (SS) Selected topics of current interest concerning empirical research on personality. Strategies for the definition of research questions and the evaluation of research progress. Prerequisite: consent of instructor or graduate status. One course. *M. Wallach*

255S-256S. Life-Span Development I and II. (SS) Behavioral and psychological development. 255S: the origins and course of cognitive and emotional development (including language, memory, achievement, affective regulation of behavioral process). 256S: components of personality and social development (including attachment relations, self esteem, social interactive process, moral development). Broad issues in the interrelationships of environmental context and individual phenomenon in the emergence of these processes. Longitudinal and cross-sectional approaches to the empirical examination of life course phenomenon. Applications to models of both normative and pathological development. Two courses. *Costanzo, Goldstein, and staff*

261S. Advanced Learning Theory (C). (SS) Selected topics in the data and theory of basic processes of learning, memory, and motivation in animals and humans. Emphasis on the nature of theory construction and evaluation, and the relation of current perspectives to older ones. Consent of instructor required. One course. *Holland*

262S. Minority Mental Health: Issues in Theory, Treatment, and Research (P, H). (SS) Survey and discussion of theoretical, research, and clinical issues in minority mental health with special emphasis on African-Americans. Prerequisites: Psychology 119 and consent of instructor. One course. *Anderson*

264S. Gender, Hormones, and Health (P, H). (SS) Hormone effects on behavior in animals and humans with topics including pubertal, menstrual-cycle, sex-related, and gender-related effects on mood, behavior, cognition, and health. Prerequisites: consent of instructor and junior or senior status. C-L: Women's Studies. One course. *Hamilton*

270S, A-R, U-Z. Selected Problems. New courses not yet in the bulletin are designated as 170S or 270S depending on level. Since all faculty offer these courses, their contents vary accordingly. Different courses indicated by the letter. One course. *Staff*

273. Statistics I (G). (QR) Foundations of probability and statistical inference. Introduction to the general linear model via multiple regression. Emphasis on application via statistical computing with SAS. Prerequisites: for undergraduates—consent of instructor and Psychology 117 or equivalent. One course. *Terry*

274. Statistics II (G). (QR) Basic and advanced ANOVA models via the GLM. Broad-based overview of multivariate models, including MANOVA, canonical correlation, discriminant analysis, and factor analytic models. Emphasis on application and use of computer packages. Prerequisites: for undergraduates—consent of instructor; Psychology 117 or equivalent and Psychology 273. One course. *Terry*

280S. History and Systems of Psychology (B, C, D, H, P). (SS) The birth, course, present, and future of psychology from the ancient philosophers to neural networks and neuroanatomy. Prerequisites: consent of instructor and Psychology 11, 103, 105, 107, 108, or 109. One course. *Serra*

288S. Advanced Topics in Social Science and Law (P). (SS) Study of one broad domain in social science and law; exact content area to vary by semester. Emphasizes how empirical findings in social science are translated and used by the legal system. Possible areas include women's legal issues, family violence, expert testimony, employment discrimination. Prerequisites: Psychology 129 and consent of instructor. One course. *Fischer*

COURSES CURRENTLY UNSCHEDULED

113. Research Methods in Psychology (B, C). (SS)

153S. Issues in Language Development (C, D). (SS)

163S. Stress and Coping (H, P). (SS)

172S. Pain: Coping and Adaptation (H). (SS)

215S. Cognitive Development (C, D). (SS)

217S. Advanced Social Psychology (P). (SS)

219S. Physiological Foundations of Psychology (B, P). (NS)

220S. Psycholinguistics (C). (SS)

222. Behavioral and Neural Modeling (B). (NS)

266S. Comparative Neurobiology (B). (NS)

289S. Psychology of Prevention (P). (SS)

THE MAJOR

For the A.B. Degree

Corequisites. For quantitative methods, the student is to take one of the following: Mathematics 136; Sociology 133; Statistics 110, 112, 113, 210B, 213; or Psychology 117

(none of which count as one of the eight required courses in psychology). For a background in the biological context of behavior, the student is to take one of the following: Biology 19, 21L, or 22L.

Major Requirements. Eight courses in psychology are required for the major, which is devised to provide depth and breadth, a small group course in psychology, and familiarity with the quantitative methods involved in psychology. For breadth, the student is required to take two introductory and survey courses including: (1) either 103 (Biological Bases of Behavior) or 107 (Cognitive Psychology), and (2) either 105 (Developmental Psychology), 108 (Personality and Social Behavior), or 109 (Health Psychology). These introductory and survey courses define five areas of concentration in psychology as listed above. For depth, the student is required to take at least two courses in one of these areas in addition to the introductory course in that area of concentration. For instruction in small groups, the student is to take at least one seminar (number 140S and above, including 200-level courses). It is advisable that this seminar be in the student's area of concentration.

For purposes of the major, Sociology 106 is the equivalent of Psychology 116, and Sociology 133 is the equivalent of Psychology 117. A student guidebook describing the curriculum in detail is available from the director of undergraduate studies. Of the eight psychology courses required for the major at least six must be taken in the department at Duke; others, if approved, may count toward the 34 credits needed for graduation.

For the B.S. Degree

As for the A.B. degree, with the following additions: (1) Mathematics 32 or equivalent; (2) six NS courses in at least two of the following (mathematics/natural science) departments: mathematics (100-level or above, in addition to the statistics requirement, above), computer science (100-level or above), chemistry, physics, biological anthropology and anatomy, and biology; (3) at least three of the six mathematics/natural science courses must be numbered 100 or higher; (4) at least one course that involves extensive laboratory or fieldwork (for example, experimental methods or independent research).

Neurosciences Concentration within B.S. Degree

Students completing a B.S. in psychology may elect to fulfill the requirements for a specialized concentration in neuroscience within the psychology major. Completion of that concentration would be indicated on the official transcript. For information contact the office of the Neuroscience Program and the director of undergraduate studies in psychology.

Independent Study

A program of individualized readings or an empirical research project may be carried out by arrangement with a faculty supervisor and enrollment in Psychology 191-194. A written plan of the program must be approved by the supervisor and the director of undergraduate studies. Credit for 191-194 may be recorded either as pass/fail or by means of letter grades. At most only one of these independent study courses may count toward the area of concentration requirement, and only two may count toward the major.

Honors/Distinction

Any psychology major with an overall grade point average of 3.3 and a grade point average of 3.3 in psychology courses may be a candidate for graduation with distinction in psychology and for university honors by honors project. Students qualify for and are awarded both honors together. Recommendation for these combined honors is made by a three-member faculty committee which evaluates a thesis submitted by the candidate and administers an oral examination. The thesis is expected to be in the style of a

publishable article in a psychological journal. Candidates typically enroll in independent study courses (191-194) during one or more semesters, often as early as the junior year, but enrollment in independent study is not required.

Students who wish to be considered for these honors must secure the sponsorship of a psychology department faculty member, and apply to the director of undergraduate studies no later than the time of preregistration for the fall semester of the senior year. Grade point requirements must be met at the time of application, and must be maintained thereafter. Guidelines, including deadlines and application forms, are available from the undergraduate studies office. Students are urged to review these guidelines early in their academic careers.

Public Policy Studies (PPS)

Professor Ascher, *Chair*; Assistant Professor Smith, *Director of Undergraduate Studies*; Professors Barber (political science), Behn, Clotfelter, Cook, Fleishman (law), Garson (pediatrics and medicine), Healy (environment), Hough (political science), Kuniholm, Ladd, Magat (business), Mickiewicz, Pearsall (engineering), and Price (political science); Associate Professors Conrad, Leitzel, Lipscomb, McConahay, and Rapaport; Assistant Professors Gentry (economics), Hamilton, Mayer, Miranda, and Sprinkle (health policy and pediatrics); Professors of the Practice Boothby, Broder, Harris, Sanford, and Stubbing; Visiting Professor Grummon; Visiting Associate Professor McElroy; Visiting Assistant Professors Korstad, Miller, and Ramachandran; Visiting Professor of the Practice Geller; Adjunct Associate Professor Arcia; Senior Research Scientist Vaupel; Lecturers O'dor and Payne; Visiting Lecturers Ammarell, Bates, Bovbjerg, Brown, Devine, Dyer, Eudy, Fulton, Gulley, Harkness, Henderson-James, Lampert, Lin, Pankratz, Prak, Probst, Reid, Rosenberg, Stevens, and Yeoman

A major is available in this department.

Courses in public policy are open to all students providing that any prerequisites are met.

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

55D. Introduction to Policy Analysis. (SS) Basic concepts of analytical thinking including quantitative methods for assessing the probabilities of outcomes and appraising policy alternatives. Illustrated by problems faced by busy decision makers in government, business, law, medicine. One course. *Hamilton, Leitzel, Lipscomb, or Mayer*

100A. Duke in Brussels. (SS) See C-L: Political Science 100N; also C-L: Comparative Area Studies. Variable credit. *Grieco*

107. Comparative Environmental Policies. (SS) See C-L: Political Science 107; also C-L: Comparative Area Studies. One course. *McKean*

110. Economic Analysis for Public Policy-Making. (SS) Application of microeconomic analysis to public policy areas, including agriculture, housing, taxation, and income redistribution. (Not open to students who have taken Economics 149, which also fulfills Public Policy Studies microeconomic requirement.) Prerequisite: Economics 52D or equivalent. One course. *Clotfelter, Conrad, Cook, Ladd, Leitzel, Lipscomb, or Miranda*

112. Statistics and Public Policy. (QR) Uses and limitations of statistical methods, including experimentation, for monitoring and evaluating public policies. (Not open to students who have taken Political Science 138, Statistics 10D, or Statistics 110A or 110B.) One course. *Staff*

114. Political Analysis for Public Policy-Making. (SS) Analysis of the political and organizational processes which influence the formulation and implementation of public

policy. Alternative models. Prerequisite: Political Science 90A, 91, 101, or equivalent. C-L: Political Science 145. One course. *Ascher, Hamilton, Mayer, Mickiewicz, Miller, or Smith*

116. Policy Choice as Value Conflict. (SS) Theoretical and practical problems in decision making in relation to conflicts of value and of interest. The manifestation of norms deriving from professional ethics, ideology, law, and other sources in such policy issues as welfare, environmental management, and national defense. One course. *Korstad, Payne, or Rapaport*

116D. Policy Choice as Value Conflict. (SS) Same as Public Policy Studies 116 except instruction is provided in two lectures and one small discussion meeting each week. One course. *Payne*

130S. Voluntary Organizations and Social Policy. (SS) The role of voluntary organizations in political advocacy, citizen representation, and social welfare policy. C-L: Political Science 130S. One course. *Smith*

145D. Leadership, Policy, and Change. (SS) Ethical and practical problems of leadership, including motivation, organizational morale, and strategies for large-scale change. Historical and modern case studies, literary examples, and political and psychological theory. One course. *Boothby or Payne*

146S. Leadership and Judgment. (SS) Theoretical and experiential foundation for the exercise of judgment and leadership in policy-making. Readings, in-class exercises, and a major leadership project within either the Duke or Durham community. Consent of instructor required. One course. *Staff*

147. International Environmental Politics and Policies. (SS) See C-L: Political Science 147; also C-L: Comparative Area Studies. One course. *McKean or Miranda*

148S. Environmental Policy, Summer Internship. Pass/fail grading only. Half course or one course. Prerequisite: Public Policy Studies 149S. Variable credit. Staff

149S. United States Environmental Policy. (SS) An overview of the major environmental legislation in the United States. Topics include: air and water pollution, hazardous waste, agriculture, wildlife, and institutions. Political, economic, ethical, and scientific analysis. Consent of instructor required. One course. *Miranda*

151. Administration of Justice. (SS) Analysis of policy problems and conflicts involved in the operation of the criminal justice system. Consent of instructor required. One course. *Devine*

152S. Administration of Justice, Summer Internship. Pass/fail grading only. Half course or one course. Prerequisite: Public Policy Studies 151S. Variable credit. Staff

154S. Free Press and Public Policy. (SS) Policy problems and conflicts involved in applying First Amendment principles to print and electronic journalism. Topics include libel, obscenity, privacy, national security, fair trial, and antitrust. Consent of instructor required. C-L: Film and Video. One course. *Stevens*

155S. Free Press and Public Policy, Summer Internship. Pass/fail grading only. Half course or one course. Prerequisite: Public Policy Studies 154S. Variable credit. Staff

156S. Arts Policy, Summer Internship. Pass/fail grading only. Half course or one course. Prerequisite: Institute of the Arts 150. Variable credit. Staff

157S. Health Policy. (SS) Analysis of health care problems and policies. Consent of instructor required. One course. *Henderson-James*

158S. Health Policy, Summer Internship. Pass/fail grading only. Half course or one course. Prerequisite: Public Policy Studies 157S. Variable credit. Staff

159. State and Local Public Policy. (SS) How state and local governments pay for public services. Financing education and transportation programs, the use of municipal bonds for capital projects, the design of intergovernmental aid programs, and state and local tax policy. Consent of instructor required. One course. *Ladd or Smith*

160. Nonrenewable Resource Economics and Public Policy. (SS) Microeconomic analysis of nonrenewable resources. Resource scarcity and economic interpretations of doomsday models. Rationale for government intervention into natural resource markets and the effects of governmental policies on investments, rates of extraction, and conservation. Prerequisite: Economics 149. C-L: Economics 160. One course. *Conrad*

161S. State and Local Public Policy, Summer Internship. Pass/fail grading only. Half course or one course. Prerequisite: Public Policy Studies 159S. Variable credit. *Staff*

163S. Telecommunications Policy and Regulation. (SS) Broadcast policies, the rise of cable television, spectrum allocation and authorization, and developments in common carrier telecommunications. Consent of instructor required. C-L: Film and Video. One course. *Prak*

164S. Telecommunications Policy and Regulation, Summer Internship. Pass/fail grading only. Half course or one course. Prerequisite: Public Policy Studies 163S. Variable credit. *Staff*

165. American International Economic Policy. (SS) Prerequisites: Economics 1D or 51D and 2D or 2S or 52D. See C-L: Economics 165. One course. *Staff*

167. International Policy. (SS) Relationships among organizations and agencies involved in international political and economic affairs, focusing on selected problems of international policy. Consent of instructor required. One course. *Ascher, Kuniholm, Leitzel, or Mayer*

168S. International Policy, Summer Internship. Pass/fail grading only. Half course or one course. Prerequisite: Public Policy Studies 167S. Variable credit. *Staff*

175S. The Palestine Problem and United States Public Policy. (CZ) Identification of Arab and Zionist perceptions, alternatives available to American decision makers, interest group pressures on United States policies, historical analysis as a means to improve public policy. C-L: Comparative Area Studies and History 159S. One course. *Kuniholm*

176S. American Communities: A Photographic Approach. (SS) A documentary approach to the study of American communities through individual photographic projects centered around a community of the student's choosing. Consent of instructor required. C-L: Art 118S and Film and Video. One course. *Harris or Sartor*

177S. Advanced Documentary Photography. (SS) An advanced course for students who have taken Public Policy Studies 176S or have had substantial experience in documentary fieldwork. Students complete an individual photographic project and study important works within the documentary tradition. Prerequisite: Art 118S, Public Policy Studies 176S, or consent of instructor. C-L: Art 119S. One course. *Harris*

179S. Refugees and World Politics. (SS) Examination of refugee issues in the context of domestic and international political environments. Focus on the interplay among political, social, economic, cultural, and psychological phenomena as governments of host countries, international and nongovernmental organizations, and the refugees interact in the context of ongoing crises in Africa, Southeast Asia, Central America, and the United States. C-L: Comparative Area Studies. One course. *Boothby*

180S. Writing for the Media. (SS) Workshop on writing news stories, editorials, and features for the print media. Consent of instructor required. C-L: Film and Video. One course. *Eudy or Reid*

181S. Advanced News Reporting. (SS) Students report, write, and rewrite six in-depth stories during the semester. Assignments designed to explore investigative reporting techniques and the issues that arise in writing longer, more complex stories. Prerequisite: Public Policy Studies 180S or consent of instructor. One course. *Bates and Yeoman*

188. The Psychology of Political Symbols. (SS) See C-L: Political Science 188. One course. *McConahay*

190. Internship. For students working in a public agency, political campaign, or other policy-oriented group under the supervision of a faculty member. Prior consent of assistant director of internships, placement, and alumni and director of undergraduate studies required. Pass/fail grading only. One course. *Staff*

191, 192. Independent Study. Directed reading and research. One course each. *Staff*

193, 194. Independent Study. Directed reading and research for seniors. One course each. *Staff*

195S, 196S. Selected Public Policy Topics. One course each. *Staff*

For Seniors and Graduates

216S. Economics of Education. (SS) Prerequisite: Economics 149 or Public Policy Studies 110. See C-L: Economics 216S. One course. *Clotfelter*

217. Microeconomics and Public Policy-Making. (SS) Consumption and production theory, welfare economics, theories of collective choice, market structures and regulation, and nonmarket decision making. Not open to students who have taken Public Policy Studies 110. One course. *Clotfelter or Ladd*

218. Macroeconomic Policy. (SS) Survey of macroeconomic theory and analysis of policies designed to reduce unemployment, stimulate economic growth, and stabilize prices. Conventional monetary and fiscal instruments, employment policies, and new policies designed to combat inflation. C-L: Economics 218. One course. *Leitzel or McElroy*

219. The Politics of the Policy Process. (SS) The formulation of public policies, substantive policies in a variety of contexts from local government to international affairs; the role of legislatures, interest groups, chief executives, and the bureaucracy in defining alternatives and in shaping policy from agenda formulation to implementation. Not open to students who have taken Public Policy Studies 114. C-L: Political Science 248. One course. *Ascher, Mayer, or Miller*

222. Statistics and Data Analysis for Policymakers. (QR) Not open to students who have had Mathematics 136 or Statistics 110A, 110B, 112, 113, 114, 210B, or 213. See C-L: Statistics 210A. One course. *Staff*

223. Ethics and Policy-Making. (SS) Normative concepts in politics, liberty, justice, and the public interest: historical and philosophical roots, relationship to one another and to American political tradition, and implications for domestic and international problems. Not open to students who have taken Public Policy Studies 116. C-L: Political Science 245. One course. *Rapaport*

231. Quantitative Evaluation Methods. (QR) Problems in quantifying policy target variables such as unemployment, crime, and poverty. Experimental and nonexperimental methods for evaluating the effect of public programs, including topics in experimen-

tal design, regression analysis, and simulation. Prerequisite: Public Policy Studies 222 or equivalent. One course. *Cook or McConahay*

232. Microeconomics: Policy Applications. (SS) Cost benefit analysis of public programs. Public utility regulation, pollution regulation, hospital rate setting, regulation of product safety. Quantitative methods and microeconomic theory for analysis of both normative and positive aspects of economic policy. Prerequisites: Public Policy Studies 110 or 217 or Economics 149 and familiarity with regression analysis or concurrent enrollment in Public Policy Studies 231. C-L: Economics 232. One course. *Conrad or Ladd*

236. Public Management I: Managing Public Agencies. (SS) Operations management, information and performance, personnel management, public sector marketing. One course. *Behn or Yaggy*

238. Public Budgeting and Financial Management. (SS) Fund accounting for government; techniques of financial analysis, including break-even analysis, cost accounting, cash-flow analysis, and capital budgeting; and governmental budgeting, including the budgetary process and reforms, and the budget crunch in the public sector. One course. *Stubbing*

240S. Analyzing the News. (SS) Research seminar on political messages and effects of media. Methods and findings of content analysis, survey research, critical theory, semiology; research project integrating these approaches. C-L: Film and Video and Political Science 208S. One course. *Paletz*

241. Reporting the American People. (SS) Critical analysis of the sources of information the media rely upon in reporting opinion and policy preferences: opinion polls, bellwethers, informed elites. Includes the design and execution of a public opinion poll on a topic of local or national interest. One course. *McConahay*

251S. Regulation of Vice and Substance Abuse. (SS) Focus on activities that have traditionally been defined as vices (including drinking, smoking, use of opiates, gambling, pornography, prostitution) and the problems of regulating and controlling them in a free society. Evaluation of social costs and benefits of various alternative policy interventions. Prerequisite: Economics 149 or Public Policy Studies 110. C-L: Economics 251S. One course. *Cook*

253. The Politics of Health Care. (SS) The history, status, and future of health care policy. Grounded in political theories such as distributive justice, altruism, and contractarianism. Focus on policy formation. Case discussions of American reform controversies in light of international experience. C-L: Political Science 249. One course. *Sprinkle*

255. Health Policy Analysis. (SS) Group analysis of a current health-policy problem. Project involves background research, data acquisition, analysis, writing, and presentation of a substantial policy report. Designed for candidates seeking the undergraduate certificate in health policy. Consent of instructor required. One course. *Boychuk*

256. The Economics of Health Care. (SS) The health care industry and government policies designed to alter market demand and supply relationships: national health insurance, the relationship between insurance, supply constraints, and inflation; the supply and distribution of health manpower; hospital cost containment policy. Prerequisite: Economics 149 or the equivalent or consent of instructor. One course. *Lipscomb*

257. United States Policy in the Middle East. (SS) From World War II to the present with a focus on current policy options. C-L: Comparative Area Studies. One course. *Kuniholm*

259S. State and Local Public Finance. (SS) Analysis of state and local revenue sources, intergovernmental fiscal relations, budgets and expenditures, fiscal aspects of economic development, and the municipal bond market. Policy topics include financing schools and transportation systems, tax policy, and current fiscal issues. Prerequisite: Public Policy Studies 217 or equivalent. C-L: Economics 259S. One course. *Ladd*

260. Economic Policy Analysis of Nonrenewable Resources. (SS) Economic analysis of nonrenewable resources, development, and exploration. Relationship between natural resources and other economic sectors. Emphasis on public policy tax and regulatory policy, natural resources in developing economies and foreign investment in the mining sector. Prerequisite: Economics 149, Public Policy Studies 110, or Public Policy Studies 232. C-L: Economics 260. One course. *Conrad*

261. Evaluation of Public Expenditures. (SS) Basic development of cost benefit analysis from alternative points of view, for example, equity debt, and economy as a whole. Techniques include: construction of cash flows, alternative investment rules, inflation adjustments, optimal timing and duration of projects, private and social pricing. Adjustments for economic distortions, foreign exchange adjustments, risk and income distribution examined in the context of present value rules. Examples and cases from both developed and developing countries. C-L: Economics 261 and Environment 272. One course. *Conrad*

262S. Seminar in Applied Project Evaluation. (SS) Initiate, develop, and perform a project evaluation. Range of topics include measuring the social cost of deforestation, the B1 Bomber, a child nutrition program, the local arts program. Prerequisite: Economics 285 or Public Policy Studies 261. C-L: Economics 262S. One course. *Conrad*

264S. Research Seminar: Topics in Public Policy I. (SS) Selected topics. One course. *Staff*

265S. The Process of International Negotiation. (SS) Negotiations between governments or between international institutions and governments. Explorations of historic cases, such as the U.S.-Canada Free Trade Negotiation, the INF Talks, and Camp David Summit. C-L: Canadian Studies and Political Science 265S. One course. *Mayer*

266S. Comparative Social Policy. (SS) An emphasis on advanced industrial countries. The seminar will explore the relationship between political process and public policy by making cross-national comparisons; introduce the major policy questions in the field of social policy; and provide students with some knowledge of the substance of social policy in different countries. C-L: Comparative Area Studies and Political Science 266S. One course. *Smith*

267S. Policy-Making in International Organizations. (SS) Emphasis on international financial institutions such as the World Bank and the International Monetary Fund. C-L: Political Science 267S. One course. *Ascher*

271S. Schools and Social Policy. (SS) Public schools as instruments of public policy. Economic and statistical analysis of the educational production process. Consideration of alternative school reforms. One course. *Clotfelter*

272L. Resource and Environmental Economics. (SS) Includes laboratory. Prerequisite: introductory course in microeconomics. See C-L: Environment 270L; also C-L: Economics 270L. One course. *Kramer*

274. Resource and Environmental Policy. (SS) Development of a policy analysis framework for studying resource and environmental policy. Political institutions, interest group theory, public choice theory, role of economics in policy analysis, ethics and values. Application to current and historical U.S. policy issues. Prerequisite: Environ-

ment 270L, Public Policy Studies 272, or consent of instructor. C-L: Environment 274. One course. *Healy*

284S. Public Policy Process in Developing Countries. (SS) Policy-making patterns in less developed countries; examples from Latin America, Africa, and Asia. C-L: Comparative Area Studies and Political Science 284S. One course. *Ascher*

285. Land Use Principles and Policy. (SS) Consideration of four major roles of land in the United States: as a producer of commodities, financial asset, component of environmental systems, and location of development. Analysis of market allocation of land, market failure, role of public planning and regulation. C-L: Environment 285. One course. *Healy*

286S. Economic Policy-Making in Developing Countries. (SS) Fiscal, monetary, and exchange rate policies in less developed countries; issues in public policy toward natural resources and state-owned enterprises. Prerequisite: Economics 149 or Public Policy Studies 110. C-L: Comparative Area Studies and Economics 286S. One course. *Conrad or Ramachandram*

288S. Current Issues in United States Federal Tax Policy. (SS) Prerequisite: Economics 149 or consent of instructor. See C-L: Economics 288S. One course. *Gentry*

290. Glasgow Seminar in Public Policy. (SS) Analysis of the British political system and important public policy problems in Britain including: privatization, Britain and the European community, and economic and social policy. (Taught in Scotland.) Prerequisites: Public Policy Studies 55D, three of the core courses (PPS 110, 112, 114 or 116) and consent of director of undergraduate studies. One course. *Staff*

Skills Courses

81. Essentials of Public Speaking. Basics of and practice in oral presentations, with particular attention to the gathering and organization of speech materials. Preference given to freshmen and sophomores. Does not apply toward public policy studies major. Consent of instructor required. One course. *Hill or O'dor*

82. Essentials of Public Speaking. Similar to Public Policy Studies 81, but for juniors and seniors. Not open to students who have taken Drama 81 or 82, or Public Policy Studies 81. Does not apply toward public policy studies major. One course. *Hill or O'dor*

83S. Argumentation. Analysis, investigation, evidence, reasoning and refutation, and other communication strategies. Consent of instructor required. Does not apply toward public policy studies major. One course. *O'dor*

COURSES CURRENTLY UNSCHEDULED

118S. Ethical Dilemmas and Social Policy. (SS)

166. Child Policy in the United States. (SS)

178S. Visual Language and Policy Choice. (SS)

185. American Diplomacy from the Kennedy Administration to the Present. (SS)

186S. Shaping the News. (SS)

204S. Ethics in Political Life. (SS)

221. Decision Analysis for Public Policymakers. (SS)

237. Public Management II: Managing Public Agencies. (SS)

245S. Leadership Tutorial. (SS)

- 250S. Policy, Philanthropy, and the Arts. (SS)
- 252S. United States Strategic Arms Policy. (SS)
- 254. Transportation Planning and Policy Analysis. (SS)
- 269. The Regulatory Process. (SS)
- 270S. Humanistic Perspectives on Public Policy. (SS)
- 278. Human Service Bureaucracies. (SS)
- 283S. Congressional Policy-Making. (SS)

INTERNSHIP COURSES

The internship courses provide students with an opportunity to develop a basic understanding of one or more public policy areas, to apply that understanding in a job during the summer, and to return to the classroom to build on this knowledge and experience. Normally, students take a pre-internship course during the spring semester of their junior year as one of several substantive courses including arts policy, international policy, telecommunications policy, health policy, administration of justice, state and local policy, environmental policy, and free press and public policy. Students then follow up their pre-internship course with a summer internship in Washington or Durham. Independent internships are also possible.

In order to participate in the summer internship, all majors must have completed Public Policy Studies 55D and three of the four core courses (Public Policy Studies 110, 112, 114, or 116). This requirement may be waived by the director of undergraduate studies for transfer students or others in unusual circumstances. Applications for enrollment in the internship program must be completed in the early fall and approved by the assistant director of internships, placement, and alumni.

Stipends are usually provided for all public policy studies majors enrolled in a pre-internship course and any one of the following summer courses: Public Policy Studies 148S, 152S, 155S, 156S, 158S, 161S, 164S, or 168S. All majors are encouraged to take an advanced follow-up course in the area of their summer internship.

THE MAJOR

The public policy studies major is an interdisciplinary social science program designed to provide students with the skills, analytical perspectives, and descriptive information needed to deal effectively with major contemporary social problems. The course of study familiarizes the student with the kind of contribution each of several disciplines (political science, economics, social psychology, applied mathematics, history, and ethics) can make to one's understanding of contemporary policy issues such as air pollution, crime, and international trade disputes. Opportunities are provided, both in the classroom and through field experiences, for students to integrate this material and apply it to analyzing specific public policy issues.

Students majoring in public policy participate in a variety of learning experiences including seminars, lecture and discussion classes, individual study, policy workshops, and an internship. In addition, students are urged to participate actively in programs sponsored by the Sanford Institute of Public Policy to supplement material covered in class. As a matter of policy, students are asked to evaluate teaching and course content and are provided both formal and informal opportunities to shape the program and curriculum.

Prerequisites. Economics 2D or 52D; Political Science 90A, 91, 101 or equivalent; and Public Policy Studies 55D.

Major Requirements. Public Policy Studies 110, 112, 114, 116, plus three 100/200-level elective courses; one of these must be a 200-level course. Statistics 10D or Statistics 110A

or Statistics 110B or Political Science 138 is an acceptable substitute for Public Policy Studies 112. Economics 149 is an acceptable substitute for Public Policy Studies 110. Political Science 90A, 91, 101 or equivalent is a prerequisite for Public Policy Studies 114. The requirement may be waived by the director of undergraduate studies for students with an adequate academic background in American politics. A satisfactory policy-oriented field experience approved by the assistant director of internships, placement, and alumni is required. (See Internship Courses above.)

Religion (REL)

Professor Hillerbrand, *Chair*; Professor Wintermute, *Director of Undergraduate Studies*; Professors Clark, Kort, Lawrence, C. Meyers, E. Meyers, Osborn, Sanders, and Surin (literature); Associate Professors Bland, Corless, McCollough, and Peters; Assistant Professors Cornell and Martin; Lecturer Shows

A major is available in this department.

Study in the Department of Religion arises from the recognition that religion, although it takes many forms, is a constitutive element of human existence individually and collectively. The curriculum is organized so that courses at the 40 level provide an introduction to the major religious traditions, those with significant representation and influence throughout the world. Courses at the 50 level give special attention to the authoritative texts of a major religion, in the context of its historical tradition, geographical location, and cultural ethos. Courses at the 60 level study a topic in religion from various disciplinary perspectives, with concern for their differences and impacts.

Introductory courses (Religion 40, 41, 42, 43, 44, 45, 46, 50, 52, 53, 54, 55, 56, 59, 61, and 62) are open to all undergraduates. These courses also help fulfill distributional field requirements for the religion major. Courses at the 100 level, with the exception of those specially designated, are open to all undergraduates. Courses at the 200 level are open to upperclassmen with the consent of the instructor.

40. Judaism. (CZ) Introduction to Judaic civilization from its origins to modern times. Not open to students who have taken Religion 51. C-L: Judaic Studies and Women's Studies. One course. *Staff*

41. Christianity. (CZ) Introduction to Christianity in history and modern times. One course. *Hillerbrand and staff*

42. Islam. (CZ) Introduction to Islam in history and modern times. One course. *Cornell or Lawrence,*

43. Hinduism. (CZ) Introduction to Hinduism in history and modern times. One course. *Staff*

44. Buddhism. (CZ) Introduction to Buddhism in history and modern times. Not open to students who have taken Religion 149. One course. *Staff*

45. Religions of Asia. (CZ) Problems and methods in the study of religion, followed by a survey of the historical development, beliefs, practices, and contemporary significance of the Islamic religion and religions of south and east Asia. Not open to students who have taken Religion 57. C-L: Comparative Area Studies. One course. *Cornell or Lawrence*

46. Religions of China and Japan. (CZ) Traditional religion in China and Japan and its interaction with Sino-Japanese Buddhism. Not open to students who have taken Religion 141. C-L: Comparative Area Studies. One course. *Corless*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

50. The Old Testament/Hebrew Bible. (CZ) Historical, literary, and theological investigations. C-L: Judaic Studies. One course. *C. Meyers, E. Meyers, Peters, or Wintermute*

52. The New Testament. (CZ) Origins, development, and content of thought. One course. *Martin, Sanders, or staff*

53. The Roman Catholic Tradition. (CZ) A survey of the development of Roman Catholic theology and institutions from the second century to Vatican II. One course. *Clark*

55. Biblical Literature. (AL) A study of selected Old Testament and New Testament texts, their cultural context, and the relation within them of religious meaning to literary form. One course. *Staff*

56. Religion in the West. (CZ) Judaism, Christianity, and Islam in their historical and cultural contexts, with their precursors and successors. Not open to students who have taken Religion 61 (Introduction to Religions of the West). One course. *Corless*

58. Muhammad and the Qur'an. (CZ) The Qur'an in relation to the religious experience, life, and work of Muhammad. Not open to students who have taken Religion 147. C-L: Comparative Area Studies. One course. *Cornell*

59. An Introduction to Christian Theology and Ethics. (CZ) Analysis and interpretation of faith and practice. One course. *Kort, McCollough, or Osborn*

61. Religion and Psychology. (SS) Contributions of major psychological theories to an understanding of religion, especially Christianity. Not open to students who have taken Religion 158. One course. *Shows*

62. Religion and Film. (CZ) A study of the relationship of motion pictures and religion. The inquiry will focus on the portrayal of organized religion; expressions of religious life; and religious topics, such as God, evil and morality, in motion pictures. One course. *Hillerbrand*

71A, 72A. Seminar for First- and Second-Year Students: Global Religions. (CZ) Topics and instructors to be announced. One course each. *Staff*

71B, 72B. Seminar for First- and Second-Year Students: Traditions, Texts, and Contexts. (CZ) Topics and instructors to be announced. One course each. *Staff*

71C, 72C. Seminar for First- and Second-Year Students: Theoretical Perspectives. (CZ) Topics and instructors to be announced. One course each. *Staff*

99. Perspectives in Archaeology. (CZ) Major trends and issues in archaeology, literature and material culture, history and process, and applications of archaeology to modern society. Focus on the material remains of the past and traditional and modern methods of their analysis. May be offered abroad in Duke's Summer Program in Israel or Greece. C-L: Classical Studies 99, Interdisciplinary Course 99, and Judaic Studies. One course. *C. Meyers, E. Meyers, Younger, and staff*

101. Selected Studies in the Bible: Prophets. (CZ) Analysis and interpretation of representative issues and personalities in the historical and prophetic books. C-L: Judaic Studies. One course. *Staff*

102. Selected Studies in the Bible: Writings. (CZ) Analysis and interpretation of representative forms and ideas, with particular attention to wisdom literature and psalms. C-L: Judaic Studies. One course. *Staff*

103. Islam on the Pacific Rim. (CZ) The development of Islam and Islamic civilization in Southeast and Eastern Asia from the rise of Islam to modern times. One course. *Cornell*

104. Apocalypse Then and Now: Ancient and Modern Apocalypticism. (CZ) An interdisciplinary examination of ancient Jewish and Christian apocalypticism combined with study of occurrences of apocalyptic images and themes in modern fiction, politics, art, film, and social movements. The various functions of apocalyptic in ancient and modern cultures and conflicts. One course. *Martin*

105. Theology of the Old Testament. (CZ) Emphasis upon history and eschatology, covenant, messianism, and wisdom. C-L: Judaic Studies. One course. *Wintermute*

106. Jesus and the Synoptic Gospels. (CZ) The gospel tradition in the New Testament. One course. *Staff*

108. The Life and Letters of Paul. (CZ) Paul's role in the expansion of the Christian movement, the most important aspects of his thought, and his continuing influence. One course. *Martin or Sanders*

109. Women in the Biblical Tradition: Image and Role. (CZ) C-L: Judaic Studies and Women's Studies. One course. *C. Meyers*

110. Archaeology and Art of the Biblical World. (CZ) The material culture of ancient Palestine as it relates to the Hebrew Bible, the New Testament, and early Judaism. C-L: Comparative Area Studies and Judaic Studies. One course. *C. Meyers or E. Meyers*

111. The Historical Jesus. (CZ) Historical research on the life of Jesus. One course. *Martin or Sanders*

112. Muslim Minorities in Society: From Asia to America. (CZ) The historical formation, legal status, and political options of Muslim minorities in non-Muslim nation-states. Special attention to China, the Philippines, India, Europe, and North America. Intra-Muslim and international perspectives, looking at the networks of exchange and communication since the end of colonialism. C-L: Comparative Area Studies. One course. *Cornell and Lawrence*

113. Liberation Theologies in Asia, Africa, and Latin America. (CZ) The various "Third World" liberation theologies which have emerged in Christian churches since the mid-1960s; special attention to those being developed by women in Latin America, Africa, and Asia which challenge the liberation theologies developed by their male counterparts. C-L: Comparative Area Studies. One course. *Staff*

114S. Ethical Issues in Twentieth-Century America. (CZ) A critical examination of ethical themes, with special emphasis on public policy. For participants in the Twentieth-Century America FOCUS Program only. Not open to students who have taken Religion 60. One course. *McCullough*

115-116. Introduction to Biblical Hebrew. (FL) (Divinity School courses open to undergraduates with consent of instructor.) Elements of phonology, morphology, and syntax. Exercises in reading and writing Hebrew. 116: study of the weak verb; exegetical treatment of the Book of Jonah. C-L: Judaic Studies. Two courses. *Bailey*

120. History of the Christian Church. (CZ) Crucial events, issues, structures, and writings that have shaped the Christian community and influenced Western civilization from the time of the early church to the present. C-L: History 156B. One course. *Hillerbrand*

121. Strategies of Comparative Analysis. (SS) See C-L: Comparative Area Studies 125; also C-L: Cultural Anthropology 125, History 137, Political Science 125, and Sociology 125. One course. *Staff*

122. The Age of the Reformation. (CZ) Religious change and political consolidation in Europe: 1500-1650. One course. *Hillerbrand*

124. History of Religion in America. (CZ) A historical survey, with emphasis on the ways that religious experiences, beliefs, and traditions have found expression in religious communities and institutions, and in American public life. One course. *Staff*

125. Women and Sexuality in the Christian Tradition. (CZ) A historical survey of Christian attitudes and practices from New Testament times to the present. C-L: Comparative Area Studies and Women's Studies. One course. *Clark*

126. Russian Orthodoxy. (CZ) See C-L: Russian 129. One course. *Pelech*

128. Christians in Crisis. (CZ) Christian thought and debate on, and theological analysis of, such contemporary issues as abortion, creationism, homosexuality, liberation, poverty, racism, and sexism. One course. *Osborn*

129. Contemporary Christian Faith and Politics. (CZ) One course. *Osborn*

130. Late Antique Christian Art. (AL) See C-L: Art 130; also C-L: Classical Studies 130. One course. *Wharton*

134. Jewish Mysticism. (CZ) The main historical stages, personalities, texts, and doctrines from rabbinic to modern times. C-L: Comparative Area Studies, Judaic Studies, and Medieval and Renaissance Studies. One course. *Bland*

136. Contemporary Jewish Thought. (CZ) Modern Jewish thought from Mendelssohn to the present, with particular reference to American thinkers. C-L: Comparative Area Studies and Judaic Studies. One course. *Bland or E. Meyers*

137. An Introduction to Judaism in the Greco-Roman World. (CZ) History, religion, and literature of the Jews in Palestine from 200 B.C.E. to 66 C.E. Not open to students who have taken Religion 277. One course. *Sanders*

140. Religions of India. (CZ) Major religious traditions of the subcontinent: Hinduism, Buddhism, Jainism, and Islam. C-L: Comparative Area Studies. One course. *Lawrence or staff*

148. Modern American Religious Cults. (CZ) New or alternative religious groups such as the Moonies, Hare Krishnas, Wicca, Satanism, Scientology, TM, Eckankar, UFO cults, and the New Age Movement. One course. *Partin*

151. Ethical Issues in Social Change and Public Policy. (CZ) American moral tradition and factors in social change in the normative analysis of public policy, with a consideration of specific ethical issues. One course. *McCullough*

152. Islamic Mysticism. (CZ) Sufism as an ascetical protest movement that affected the worldwide growth of Islam. C-L: Comparative Area Studies. One course. *Lawrence*

153. From the African Kraal to the African-American Church. (CZ) The religious transition and adaptation of the West African diaspora in America. C-L: African and Afro-American Studies 153. One course. *Lincoln*

154. Cult, Sect, and Church in Black Religion in America. (CZ) The varied expressions of African-American spirituality as the black church matures as the preeminent definition of African-American Culture. C-L: African and Afro-American Studies 152. One course. *Staff*

155. Ethical Issues in the Life Cycle. (CZ) Human development viewed in religious, ethical, and psychological perspectives. One course. *McCullough*

159. Ethical Issues in Health Care. (CZ) A theological and comparative study of selected ethical issues in health policy: the profession of medicine, institutional organization and services, and medical practice. One course. *McCullough*

160, 161. Introduction to the Civilizations of Southern Asia. (CZ) See C-L: Interdisciplinary Course 101, 102; also C-L: Asian and African Languages and Literature 160, 161; Comparative Area Studies; Cultural Anthropology 101, 102; and History 193, 194. One course each. *Khanna or staff*

162, 163. Introduction to Islamic Civilization. (CZ) See C-L: Interdisciplinary Course 162, 163; also C-L: Comparative Area Studies; Cultural Anthropology 147, 148; History 101G, 102G; and Medieval and Renaissance Studies. One course each. *Cornell, Lawrence, and staff*

164. History and Religions of North Africa. (CZ) An introduction to the cultural patterns, social forces, and historical developments that have shaped North Africa and its major religious traditions. C-L: African and Afro-American Studies 164, Comparative Area Studies, History 187, and Interdisciplinary Course 164. One course. *Cornell or Lawrence*

167. The Reformation of the Sixteenth Century. (CZ) A survey of the changes in sixteenth-century European society, with particular reference to the continent, which grew out of the movement for religious reform and renewal. Focus on new developments in theology and religion and their relationship to society. C-L: History 156A. One course. *Hillerbrand*

170. Problems of Religious Thought. (CZ) Analysis of uses of *know, true, mind, body, time, person, love, meaning*, in modern Western culture as introduction to religious reflection. One course. *Staff*

174. Technology Assessment and Social Choice. (CZ) See C-L: Engineering 174. One course. *Garg and McCullough*

186. Faith and Fiction in Victorian England. (AL) The relation of fiction to major religious and theological developments in England during the Victorian period. (Summer program in England.) Not open to students who have taken English 137. C-L: English 132A. One course. *Kort*

187. Atmosphere and Mystery in Twentieth-Century English Fiction. (AL) Narrative atmosphere in English fiction of this century in relation to beliefs about circumstances that limit and determine the human world. Not open to students who have taken English 138. C-L: English 132B. One course. *Kort*

188. Religion in Recent American Fiction. (AL) Religious elements in recent literature. One course. *Kort*

189. Autobiography and Religious Identity. (CZ) A study of contemporary autobiographies by Jewish, Catholic, and Protestant writers, of theories concerning autobiography and religious identity, and of autobiography as a kind of writing. One course. *Kort*

190S. The Family in Christian History. (CZ) Open to sophomores, juniors, and seniors. Consent of instructor required. See C-L: Distinguished Professor Course 197S; also C-L: Women's Studies. One course. *Clark*

191, 192. Independent Study. For freshmen and sophomores with departmental approval. One course each. *Staff*

193, 194. Independent Study. For juniors and seniors with departmental approval. One course each. *Staff*

195A, 196A. Junior-Senior Seminars: Global Religions. (CZ) Topics and instructors to be announced. One course each. *Staff*

195B, 196B. Junior-Senior Seminars: Traditions, Texts, and Contexts. (CZ) Topics and instructors to be announced. C-L: Judaic Studies. One course each. *Staff*

195C, 196C. Junior-Senior Seminars: Theoretical Perspectives. (CZ) Topics and instructors to be announced. One course each. *Staff*

197-198. Honors Research. Consent of the director of undergraduate studies required. Two courses. *Staff*

For Seniors and Graduates

201. Studies in Intertestamental Literature. (CZ) Selected documents of the Apocrypha and Pseudepigrapha examined exegetically and theologically in their relation to postexilic Judaism. Consent of instructor required. One course. *Wintermute*

202. Language and Literature of Dead Sea Scrolls. (CZ) A study in interpretation. Prerequisite: a knowledge of Hebrew. One course. *Wintermute*

207, 208. Readings from the Hebrew Bible. (FL) Grammar with rapid reading of selected passages, both prose and poetry. Prerequisite: at least one year of Hebrew or consent of instructor. C-L: Judaic Studies and Old Testament 207, 208. One course each. *Staff*

212. Religion: Interpretations and Perspectives. (CZ) Approaches and methods used for studying religion. Emphasis on the description, explanation, and analysis of such concepts as religion, religious experience, and religious practice. One course. *Staff*

216. Syriac. (CZ) The script and grammar, with readings from the Syriac New Testament and other early Christian documents. Prerequisites: some knowledge of Hebrew and Aramaic. One course. *Wintermute*

217. Islam in India. (CZ) History and thought of major Indian Muslims from Biruni to Wali-Ullah, with special attention to the role of Sufism. An introduction to selected Muslim scholars and saints who contributed to the interaction between Islam and Hinduism in northern India during the second millenium A.D. C-L: Comparative Area Studies. One course. *Lawrence*

218. Religions of East Asia. (CZ) Shinto, Taoism, Confucianism, and East Asian Buddhism studied phenomenologically in relation to the Axial Age. C-L: Comparative Area Studies. One course. *Corless*

220. Rabbinic Hebrew. (FL) Interpretive study of late Hebrew, with readings from the Mishnah and Jewish liturgy. C-L: Judaic Studies. One course. *E. Meyers or staff*

221. Readings in Hebrew Biblical Commentaries. (CZ) Selected Hebrew texts in Midrash Aggadah and other Hebrew commentaries reflecting major trends of classical Jewish exegesis. C-L: Judaic Studies. One course. *Bland*

224A. Comparative Semitic I. (FL) An introduction to the morphology and syntax of classical Ethiopic and the Semitic languages of Mesopotamia, together with a consideration of their relationships to Hebrew. One course. *Wintermute*

224B. Comparative Semitic II. (FL) An introduction to the morphology and syntax of classical Arabic and the Semitic languages of Palestine-Syria, together with a consideration of their relationships to Hebrew. One course. *Wintermute*

226F. Exegesis of the Greek New Testament (I and II Corinthians). (CZ) Consent of instructor required. One course. *Staff*

228. Twentieth-Century Continental Theology. (CZ) An investigation of leading theologians and theological trends. One course. *Osborn*

229S. Old Church Slavonic. (FL) See C-L: Russian 203S; also C-L: Linguistics. One course. *Pugh*

231S. Seminar in Religion and Contemporary Thought. (CZ) Analytical reading and discussion of such critical cultural analysis as is found in the works of Polanyi, Arendt, Trilling, and others, with appraisal of the relevance of theological inquiry. One course. *Staff*

232S. Religion and Literary Studies. (AL) Theories concerning the relation of religion to literary forms, particularly narrative. One course. *Kort*

233. Modern Narratives and Religious Meanings. (AL) A study of kinds of religious meaning or significance in representative American, British, and continental fiction of the first half of the twentieth century. One course. *Kort*

234. Early Christian Asceticism. (CZ) The development of asceticism and monasticism in the first six centuries of Christianity. C-L: Women's Studies. One course. *Clark*

235. Heresy: Theological and Social Dimensions of Early Christian Dissent. (CZ) One course. *Clark*

239. Introduction to Middle Egyptian I. (FL) Grammar and readings in hieroglyphic texts relating to the Old Testament. One course. *Wintermute*

248. Theology of Karl Barth. (CZ) A historical and critical study of Barth's theology. One course. *Osborn*

253. Feminist Theory and the Study of Christianity. (CZ) Nineteenth- and twentieth-century feminist theories and their implications for Christian doctrine and biblical interpretation. C-L: Women's Studies. One course. *Clark and McClintock-Fulkerson*

254. Justice, Law, and Commerce in Islam. (CZ) Islamic approaches to the legal and ethical regulation of social life. One course. *Cornell*

258. Coptic. (FL) Introduction to the Sahidic dialect with selected readings from Christian and Gnostic texts. Prerequisite: one year of Greek or consent of instructor. One course. *Wintermute*

275S. Topics in Early Christian and Byzantine Art. (AL) Consent of instructor required. See C-L: Art 233S; also C-L: Classical Studies 230S and Medieval and Renaissance Studies. One course. *Wharton*

277. Judaism in the Greco-Roman World. (CZ) History, religion, and literature of the Jews in Palestine from 200 B.C.E. to 66 C.E. Not open to students who have taken Religion 137. Prerequisite: one year of Greek. One course. *Sanders*

284. The Religion and History of Islam. (CZ) Origins and development of the Islamic community and tradition, with particular attention to the religious element. C-L: Comparative Area Studies. One course. *Cornell or Lawrence*

COURSES CURRENTLY UNSCHEDULED

52D. The New Testament. (CZ)

54. Protestant Traditions. (CZ)

- 100. Selected Studies in the Bible: Pentateuch. (CZ)
- 107. Theology of the New Testament. (AL)
- 123. Issues in Early Christian History. (CZ)
- 131D. Principles of Archaeological Investigation. (CZ)
- 132D. Palestine in Late Antiquity. (CZ)
- 133. The Foundations of Post-Biblical Judaism. (CZ)
- 135. Jewish Religious Thought. (CZ)
- 143. Mysticism. (CZ)
- 157. Bioethics in Comparative Contexts. (CZ)
- 226B. Exegesis of the Greek New Testament (Romans). (CZ)
- 240. Introduction to Middle Egyptian II. (FL)
- 243. Archaeology of Palestine in Biblical Times. (CZ)
- 244. Archaeology of Palestine in Hellenistic-Roman Times. (CZ)
- 261. Islam in the African-American Experience. (CZ)
- 264. The Sociology of the Black Church. (SS)
- 274A. Philosophies, Sciences, and Theologies of the European Enlightenment: Descartes to Kant. (CZ)
- 274B. Philosophies, Sciences, and Theologies after the European Enlightenment: Schleiermacher to Troeltsch. (CZ)
- 280. The History of the History of Religions. (CZ)
- 283. Islam and Modernism. (CZ)
- 288. Buddhist Thought and Practice. (CZ)
- 297. Philosophical and Theological Discourses on Modernity. (CZ)
- 298. Religious Pluralism and Christian Theologies. (CZ)

RELIGION COURSES BY AREA

For students matriculating in the fall 1994 semester and thereafter:

A. Global Religions. (Division I—40, 41, 42, Division II—43, 44, 45, 46), 71A, 72A, 134, 143, 149, 152, 160, 161, 162, 163, 195A, 196A, 284, 288.

B. Traditions, Texts, and Contexts. 50, 52, 53, 54, 55, 56, 58, 59, 71B, 72B, 100, 101, 102, 103, 105, 106, 107, 108, 109, 111, 112, 113, 115, 116, 122, 123, 124, 125, 128, 129, 130, 132D, 133, 135, 136, 137, 140, 148, 153, 154, 164, 167, 168, 195B, 196B, 201, 202, 207, 208, 2116, 217, 218, 220, 221, 224A, 224B, 226B, 226F, 228, 229S, 234, 235, 239, 240, 243, 244, 248, 254, 258, 261, 275, 277, 283.

C. Theoretical Perspectives. 61, 62, 71C, 72C, 99, 104, 110, 114S, 121, 131D, 151, 155, 157, 159, 170, 186, 187, 188, 189, 195C, 196C, 212, 231S, 232S, 233, 253, 264, 274A, 280, 297, 298.

Students who matriculated prior to fall 1994 should also consult the 1993-94 Bulletin for the list of courses in the three fields applicable to their major. (See The Major below.)

THE MAJOR

For students matriculating in the fall 1994 semester and thereafter:

Major Requirements. Eight courses, which must include at least two courses from Global Religions, one from Division I and one from Division II of the 40-level courses.

There must be a minimum of one 100-level course in traditions, texts, and contexts and one in theoretical perspectives. One of the eight courses must be a junior-senior seminar, independent study or a 200-level course. The student, in consultation with an assigned advisor and with the advisor's approval, will choose a concentration of four related courses. The four courses constitute a thematic or methodological concentration on a particular aspect of religion.

For students who matriculated before the fall 1994 semester:

Students may satisfy the requirements listed above for those matriculating in the fall 1994 semester and thereafter, or they may satisfy the requirements as published in the bulletin for the year that they matriculated.

To prepare for graduate or professional study of religion, the department recommends that students complete at least four courses in college level study, or the equivalent, of a foreign language. Master of Arts and Doctor of Philosophy programs often require examination in one or two foreign languages. Students planning to attend a theological seminary should note that knowledge of biblical languages, as well as Latin, frequently is presupposed or required. Those planning to pursue studies of Asian religions should begin appropriate language study as part of their undergraduate preparation.

Honors/Distinction. The department offers work leading to graduation with distinction. For further information consult the director of undergraduate studies and the section on honors in this bulletin.

Romance Studies (RS)

Professor Mignolo, *Chair*; Associate Professor Ross, *Director of Undergraduate Studies*; Professors Caserta, Garci-Gómez, Jameson, Moi, Mudimbe, Orr, Osuna, Pérez Firmat, Schor, Stewart, Tetel, and Thomas; Associate Professors Bell, Finucci, Kaplan, Longino, Mudimbe-Boyi, and Sieburth; Assistant Professors Moreiras, Solterer, and Vilarós; Associate Professor of the Practice and Director of Language Programs Tufts; Research Associate Professor Keineg; Adjunct Associate Professor Byrd; Visiting Research Professor Dorfman; Lecturer and Assistant Coordinator of Language Programs Cowell

Majors in French Studies, Italian Studies, and Spanish are available in this department.

French, Italian, and Spanish 22, 76, or an Achievement or Placement Test score of 600 in French, 600 in Italian, and 630 in Spanish, are prerequisites for all courses at or above the 100 level not taught in English. Students who by reason of foreign residence have had special opportunities in French, Italian, or Spanish must be classified by the director of undergraduate studies. The intensive language courses 21 and 22 provide an introduction to the language. They are recommended for students who wish to acquire proficiency in a second foreign language before entering graduate school. In literature, one credit is granted for a score of 4 and two credits for a score of 5 (French or Spanish 70, 71) on the examination of the advanced placement program. In language, one advanced placement credit (French or Spanish 76) is granted for scores of 4 and 5.

FRENCH (FR)

1-2. Elementary French. (FL) Understanding, speaking, reading, and writing French. Language laboratory for recording-listening practice. Two courses. *Staff*

12. Review of Elementary French. (FL) Intensive review of first-year French. Open only to students with a placement or achievement score of 380-440. May not be taken for credit by students who have taken 1-2. One course. *Staff*

14. Intensive Study of French. (FL) Covers the entire program of elementary French study in one semester using a media-based approach. Primary focus on oral skill development, with additional work on reading and writing. Two courses. *Staff*

14A. Intensive Study of French. (FL) Understanding, speaking, reading, and writing French. Offered only in the Duke in Québec Summer Program. Placement of returning students intending to continue in French studies determined by interview. Two courses. *Staff*

15. Intensive French. (FL) Covers the entire program of intermediate language study in one semester using a media-based approach. Continued emphasis on oral skill development and the introduction of progressively longer and more challenging reading and writing activities. Prerequisite: French 14 or the equivalent. Two courses. *Staff*

21. Accelerated Elementary French. (FL) Basic grammar structures in one semester; emphasis on oral work. Prerequisite: four semesters or the equivalent of another foreign language or consent of instructor. One course. *Staff*

22. Accelerated Intermediate French. (FL) Review of basic grammar; emphasis on reading, with some practice in writing. Prepares students to enroll in courses at the 100 level. Prerequisite: French 21 or consent of instructor. One course. *Staff*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

63. Intermediate French. (FL) Grammar review, reading, and oral practice, including laboratory experience. Prerequisite: French 2, 12, or achievement or placement test score of 450-540. One course. *Staff*

70, 71. Introduction to Literature. One or two course credits for advanced placement in literature. One course each.

76. Advanced Intermediate French. (FL) Oral practice, reading, composition. Prerequisite: French 63 or achievement or placement test score of 550-590. One course. *Staff*

100. Cultural and Literary Perspectives. (FL) Designed to give students leaving intermediate French the reading and writing skills necessary to enter 100-level courses in French studies. A close reading of cultural and literary texts which focus on themes such as daily life, philosophy, art, etc. One course. *Staff*

101, 102. Introduction to French Literature. (AL, FL) An introduction to the major writers of the French literary tradition. Selections and complete works of poetry, fiction, theater, and essay. 101: Middle Ages through the eighteenth century. 102: nineteenth and twentieth centuries. Lectures and discussions; short essays and tests. Conducted in French. One course each. *Staff*

103S, 104S. Discussions of Readings. (AL, FL) Selected topics. Open only to freshmen and sophomores. One course each. *Staff*

105. Topics in French Thought and Culture from the Middle Ages to 1900. (CZ, FL) Topics such as class and social relationships; the nation and centralization; authority and the state; the rise of public education; language and centralization; history of ideas and mentalities; film and media. Readings in French from documents. One course. *Staff*

106. Topics in Modern French Thought and Culture: 1900 to the Present. (CZ, FL) Topics such as racism, colonialism and its aftermath; postwar ideology; women's movement; communication development; elitist technology; labor and leisure; community and privacy; environmental issues. One course. *Staff*

movement; communication development; elitist technology; labor and leisure; community and privacy; environmental issues. One course. *Staff*

107S. Contemporary Ideas. (CZ, FL) Readings and discussion of French works which have provoked political or intellectual thought in recent years. For freshmen and sophomores only. C-L: Comparative Area Studies. One course. *Staff*

110. Advanced Grammar and Composition. (FL) A systematic study of the structure of formal French. Practice in writing. One course. *Thomas or staff*

111S. French for Current Affairs. (FL) Problems and controversies in today's France. Readings, discussions, and exposés. One course. *Keineg or staff*

113S. Commercial French. (FL) Current issues in French business and commerce. C-L: Comparative Area Studies. One course. *Staff*

117. French Phonetics. (FL) Sounds, rhythm, intonation. Individual practice in language laboratory. Readings in phonetic theory. One course. *Thomas*

118. Advanced Translation and Stylistics. (FL) Differences between French and English patterns of expression. Levels of usage. Practice in translation. Prerequisite: French 110 or equivalent or consent of instructor. One course. *Thomas or staff*

131S. French in the New World. (FL, SS) French and Creole in Canada, New England, Louisiana, and the Caribbean. Origins, history, linguistic characteristics, current political and social issues. C-L: Canadian Studies, Comparative Area Studies, and Linguistics. One course. *Thomas*

137. Aspects of Contemporary French Culture. (CZ, FL) Offered only as part of summer program in Paris. C-L: Comparative Area Studies. One course. *Staff*

139. French Civilization. (CZ, FL) The institutions and culture of France from the Middle Ages to the present. Readings and discussions in French. C-L: Comparative Area Studies. One course. *Keineg or Tetel*

141S, 142S. French Literature. (AL, FL) Topics to be announced. Open to juniors and seniors. One course each. *Staff*

143. Aspects of French Literature. (AL, FL) Concentration on single authors, genres, movements, or themes. Topics to be announced. Offered only as part of summer program in Paris. One course. *Staff*

145S. Topics in Renaissance Literature and Culture. (AL, FL) Topics may include: women writers, love and self-knowledge, carnival and the grotesque, in search of Rome, text as political and religious pamphlet. C-L: Comparative Area Studies and Medieval and Renaissance Studies. One course. *Tetel*

146S. Montaigne and Self-Portraiture. (AL, FL) A reading of some *essais* in the light of the self-portrait in Renaissance art. C-L: Medieval and Renaissance Studies. One course. *Tetel*

148. French Drama of the Seventeenth Century. (AL, FL) The plays of Corneille, Racine, and Molière read in conjunction with several twentieth-century works to explore dramatic conventions and the difference between tragedy and comedy. C-L: Drama 126 and Medieval and Renaissance Studies. One course. *Longino*

152. The Early French Novel. (AL, FL) Origins and evolution of the novel in the seventeenth and eighteenth centuries: Madame de Lafayette, Marivaux, Prévost, Rousseau, Diderot, Laclos, Sade. One course. *Stewart*

153. The French Enlightenment. (AL, FL) Religion, politics, and philosophic and literary ideas of eighteenth-century France: Montesquieu, Voltaire, Rousseau, and others. C-L: Comparative Area Studies. One course. *Stewart*

156. The Age of the Novel. (AL, FL) Flaubert, Balzac, and Stendhal. One course. *Bell, Orr, or Schor*

159. Feminist Fiction. (AL, FL) Works by women in the modern period, including George Sand, Colette, Simone de Beauvoir, and others. C-L: Women's Studies. One course. *Orr*

165. French Existentialism. (CZ, FL) A critical introduction to the chief positions and controversies of French existentialism. One course. *Mudimbe*

166, 167. Contemporary French Life and Thought. (AL, FL) Major writers of the twentieth century and their historical and cultural circumstances. 166: Proust, Gide and the *Nouvelle revue française*, Colette, Alain-Fournier, Mauriac and the generation of 1914; the social novel of the 1930s. 167: Existentialism and *Les Temps Modernes*, the New Novel, the writer-critics, recent trends. C-L: Comparative Area Studies and Women's Studies. One course each. *Kaplan*

168. Francophone Literature. (AL, FL) Modern literature in French from French-speaking Africa and the French Caribbean. Topics include tradition and modernity; colonization, cultural assimilation, and the search for identity; and women in changing contexts. Prerequisite: good knowledge of French. C-L: African and Afro-American Studies 138, Asian and African Languages and Literature 168, and Comparative Area Studies. One course. *Mudimbe-Boyi*

169. The Contemporary Novel in French Canada. (AL, FL) Major trends in the novel since World War II: social revolt, proletarianism, political and religious liberation, and rejection of the past. C-L: Canadian Studies and Comparative Area Studies. One course. *Keineg*

191, 192. Independent Study. Directed reading and research. Open only to qualified juniors by consent of instructor and director of undergraduate studies. One course each. *Staff*

193, 194. Independent Study. Directed reading and research. Open only to qualified seniors by consent of instructor and director of undergraduate studies. One course each. *Staff*

195. Topics in French Literature and Culture. (AL, FL) Topics to be announced. Offered only in the Duke in France Program. One course. *Staff*

200S. Seminar in French Literature. (AL, FL) Topics to be announced. One course. *Staff*

210. The Structure of French. (FL) Modern French phonology, morphology, and syntax. Readings in current linguistic theory. C-L: Linguistics. One course. *Thomas*

211. History of the French Language. (FL) The evolution of French from Latin to its present form; internal developments and external influences. C-L: Linguistics and Medieval and Renaissance Studies. One course. *Thomas*

223. Semiotics for Literature. (AL) Theoretical writings in general semiotics by Frege, Peirce, Saussure, Mukarovsky, and Morris and their applications for textual analysis of French literary works by representative contemporary critics such as Eco, Riffaterre, Corti, and Greimas. Taught in English. C-L: Literature 280. One course. *Thomas*

256. Modern Literature and History. (AL) The problems of history, society, and politics in literature, through the writings of Rousseau, Tocqueville, Michelet, Flaubert, Hugo, Merleau-Ponty, Foucault, and others. C-L: History 256. One course. *Orr*

258. The Narrative of Social Crisis. (AL, FL) Realism and naturalism, with special emphasis on Balzac, Flaubert, and Zola. One course. *Bell, Jameson, Orr, or Schor*

261. French Symbolism. (AL, FL) Poetry and theories of Baudelaire, Mallarmé, and Rimbaud. Decadence: Lautréamont and Laforgue. One course. *Thomas*

264. Contemporary French Poetry. (AL, FL) The language of poetry. A chronological and theoretical approach to the major poets and movements since 1950. Selections from Bonnefoy, Char, Daive, Deguy, Dupin, Jabès, Jaccottet, Faye, Guillevic, Michaux, Meschonnic, Noël, Oulipo, Ponge, Stefan, Tortel, and others. One course. *Orr or Thomas*

265. French Literature of the Early Twentieth Century. (AL, FL) Emphasis on Gide, Mauriac, Proust, and Colette. One course. *Kaplan*

266. French Literature of the Mid-Twentieth Century. (AL, FL) Emphasis on Malraux, Sartre, Camus, and the *nouveau roman*. One course. *Jameson*

281. Paradigms of Modern Thought. (AL) An introduction to contemporary French philosophy with a focus on the notions of identity and difference, the human origin of truth and the question of enunciation. French majors and French graduate students must do course work in French. One course. *Mudimbe*

Courses Currently Unscheduled

108S. French Women: Myths, Realities, and the Law. (CZ, FL)

112S. Special Topics in Advanced Language. (FL)

136S. Life in Eighteenth-Century France. (CZ, FL)

147. The Roots of Modernity in Seventeenth-Century Literature. (AL, FL)

151. French Comedy. (AL, FL)

155. Romanticism in French Literature. (AL, FL)

157. Difference and Representation. (AL, FL)

158. Toward Modernism in French Poetry. (AL, FL)

162. French Drama of the Twentieth Century. (AL, FL)

163. French Poetry of the Twentieth Century. (AL, FL)

170. Film and the French Novel. (AL, FL)

240. Old French Literature. (AL, FL)

257. Problems of Identity in the Nineteenth-Century Novel. (AL, FL)

263. Contemporary French Theater. (AL, FL)

290S. Studies in a Contemporary Figure. (AL, FL)

ITALIAN (IT)

1-2. Elementary Italian. (FL) Understanding, speaking, reading, and writing Italian. Language laboratory available for recording-listening practice. Two courses. *Staff*

11. Intensive Study of Italian. (FL) For beginners or intermediate students. Practice in understanding, speaking, reading, and writing; emphasis on spoken and written

language patterns used in everyday life in Italy. Offered in the Duke in Bologna semester program. Placement test administered to returning students intending to continue Italian language studies. One course. *Staff*

21. Accelerated Elementary Italian. (FL) Basic grammar structures in one semester; emphasis on oral work. Prerequisite: four semesters or the equivalent of another foreign language or consent of instructor. One course. *Staff*

22. Accelerated Intermediate Italian. (FL) Readings in modern literature; analysis and discussion. Prepares students to enroll in courses at the 100 level. Prerequisite: Italian 21 or consent of instructor. One course. *Staff*

63. Intermediate Italian. (FL) Grammar review, reading, oral practice including laboratory experience. One course. *Staff*

76. Advanced Intermediate Italian. (FL) Oral practice, reading, and composition. Prerequisite: Italian 63 or achievement or placement test score of 550-590. One course. *Staff*

101, 102. Introduction to Italian Literature. (AL, FL) Major writers of the Italian literary tradition. Selections and complete works of poetry, fiction, theater, and essay. 101: Middle Ages to the seventeenth century. 102: Eighteenth, nineteenth, and twentieth centuries. Lectures and discussions; short essays and tests. Conducted in Italian. 101 cross-listed with Medieval and Renaissance Studies. One course each. *Caserta or Finucci*

105. Italian Women Writers. (AL, FL) Representative works by women from the Middle Ages to the modern period. Caterina da Siena, Colonna, Stampa, Aleramo, Deledda, Morante, and others. C-L: Comparative Area Studies and Women's Studies. One course. *Finucci*

107. Italian Short Fiction. (AL, FL) Novellas and short stories from the Middle Ages to the present. One course. *Finucci*

110. Advanced Readings and Composition. (FL) Practice in writing; introduction to the techniques of literary styles. One course. *Finucci*

111S. Special Topics in Advanced Language. (FL) Intensive instruction in Italian using newspapers, short stories, and films in order to enhance oral fluency. One course. *Caserta*

122. Topics in Italian Literature in Translation. (AL) Single authors, genres, movements, or themes. Topics to be announced. One course. *Finucci*

123. Aspects of Italian Literature. (AL) Concentration on single authors, periods, genres, regions, or themes. Topics to be announced. Offered only in the summer program in Florence, Italy. Taught in English. One course. *Finucci*

131. Topics in Italian Civilization. (CZ, FL) The institutions and culture of Italy throughout the centuries. Topics to be announced. C-L: Comparative Area Studies. One course. *Finucci*

139. Modern Italy. (CZ, FL) Political, social, economic, and cultural problems in Italian history from 1861 to the present. One course. *Caserta*

141S, 142S. Italian Literature. (AL, FL) Topics to be announced. Open to juniors and seniors. One course each. *Staff*

145S. Topics in Renaissance Literature and Culture. (AL, FL) Topics may include: epic, women writers, treatises, Petrarchism, theater. C-L: Medieval and Renaissance Studies. One course. *Finucci*

151. The Italian Theater. (AL, FL) Introduction to the Italian theatrical tradition. Content varies; six to eight plays from the Renaissance to the present. One course. *Finucci*

155S. Nineteenth-Century Italian Literature. (AL, FL) An historical and aesthetic appreciation of principal works of selected major Italian writers of the nineteenth century. C-L: Comparative Area Studies. One course. *Caserta*

170. Film and the Italian Novel. (AL, FL) Novels and classical narrative cinema. Topics such as novels and their cinematic versions, war, women's fiction and the woman's picture, and neorealism in novel and film. C-L: Comparative Area Studies and Film and Video. One course. *Finucci*

191, 192. Independent Study. Directed reading and research. Open only to qualified juniors by consent of instructor and director of undergraduate studies. One course each. *Staff*

193, 194. Independent Study. Directed reading and research. Open only to qualified seniors by consent of instructor and director of undergraduate studies. One course each. *Staff*

283. Italian Novel of the Novecento. (AL, FL) Representative novelists from Svevo to the most recent writers. One course. *Caserta*

284, 285. Dante. (AL, FL) 284: *La Vita Nuova* and a close reading of the *Inferno*. 285: The *Purgatorio* and the *Paradiso* in the light of Dante's cultural world. Special attention will be given to the poetic significance of the *Commedia*. Reading in Italian or English. Prerequisite: for 285, Italian 284 or equivalent. C-L: Medieval and Renaissance Studies. One course each. *Caserta*

PORTUGUESE (PTG)

21. Accelerated Elementary Portuguese. (FL) Basic grammar structures in one semester; emphasis on oral work. Prerequisite: four semesters of another foreign language or consent of instructor. One course. *Staff*

22. Accelerated Intermediate Portuguese. (FL) Review of basic grammar; emphasis on reading, with some practice in writing. Prepares students to enroll in courses at the 100 level. Prerequisite: Portuguese 21 or consent of instructor. One course. *Staff*

111S. Portuguese for Current Affairs. (FL) Advanced instruction in Portuguese using journalistic readings, film, and television, to improve fluency and to explore issues facing the Portuguese-speaking world. Prerequisite: Portuguese 22, or equivalent. One course. *Staff*

191, 192, 193, 194. Independent Study. One course each. *Staff*

200S. Seminar in Portuguese Literature. (AL, FL) Topics to be announced. One course. *Staff*

SPANISH (SP)

1-2. Elementary Spanish. (FL) Understanding, speaking, reading, and writing Spanish. Language laboratory available for recording-listening practice. Two courses. *Staff*

12. Review of Elementary Spanish. (FL) Intensive review of first-year Spanish. Open only to students with a placement or achievement score of 430-490. May not be taken for credit by students who have taken 1-2. One course. *Staff*

14. Intensive Study of Spanish. (FL) Covers the entire program of elementary Spanish study in one semester using a media-based approach. Primary focus on oral skill development, with additional work on reading and writing. Two courses. *Staff*

15. Intensive Spanish. (FL) Covers the entire program of intermediate language study in one semester using a media-based approach. Continued emphasis on oral skill development and the introduction of progressively longer and more challenging reading and writing activities. Prerequisite: Spanish 14 or the equivalent. Two courses. *Staff*

21. Accelerated Elementary Spanish. (FL) Basic grammar structures in one semester; emphasis on oral work. Prerequisite: four semesters or the equivalent of another foreign language or consent of instructor. One course. *Staff*

22. Accelerated Intermediate Spanish. (FL) Review of basic grammar; emphasis on reading, with some practice in writing. Prepares students to enroll in courses at the 100 level. Prerequisite: Spanish 21 or consent of instructor. One course. *Staff*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

63. Intermediate Spanish. (FL) Grammar review, reading, and oral practice, including laboratory experience. Prerequisite: Spanish 2, 12, or achievement or placement test score of 500-570. One course. *Staff*

70, 71. Introduction to Literature. One or two course credits for advanced placement in literature. One course each.

76. Advanced Intermediate Spanish. (FL) Oral practice, reading, composition. Prerequisite: Spanish 63 or achievement or placement test score of 580-620. One course. *Staff*

101. Advanced Composition and Conversation. (FL) The refinement of written and oral expression through the analysis of literary texts. Continued development of vocabulary and the study of grammar in context. One course. *Staff*

104S. Spanish Language: Peninsular or American. (FL) Topics to be announced. One course. *Staff*

107S. Advanced Grammar. (FL) A systematic study of modern Spanish morphology and syntax. Offered only in the Duke in Madrid program. Not open to students who have taken Spanish 117S (Advanced Grammar). One course. *Staff*

108S. Advanced Colloquial Spanish. (FL) Colloquial Spanish as a catalyst of popular culture; extensive comparisons of English and Spanish popular sayings and proverbs; emphasis on oral communication. Not open to students who have taken Spanish 118S. Prerequisite: two Spanish courses at the 100 level. One course. *Garci-Gómez*

109S. Structure of Spanish. (FL) A systematic study of modern Spanish morphology and syntax with some readings in current linguistic theory. Not open to students who have taken Spanish 119S. Prerequisite: Spanish 101. C-L: Linguistics. One course. *Staff*

110S. Introduction to Literary Analysis. (AL, FL) Different genres, including narrative, poetry, drama, essay, film, and song. Texts will be drawn from different periods of Spanish and Spanish-American literature. Not open to students who have taken Spanish 100S. One course. *Staff*

111, 112. Introduction to Spanish Literature. (AL, FL) Major writers of the Spanish literary tradition. Poetry, fiction, theater, and essay. 111: Middle Ages through the seventeenth century. 112: eighteenth, nineteenth, and twentieth centuries. Not open to students who have taken Spanish 101, 102. One course each. *Garci-Gómez, Osuna, or staff*

113S, 114S. Discussion of Readings. (AL, FL) Selected topics. Open only to freshmen and sophomores. Not open to students who have taken Spanish 103S,104S. Prerequisite: Spanish 76 or placement/achievement score of 630+. One course each. *Staff*

115, 116. Introduction to Spanish-American Literature. (AL, FL) A survey of major writers and movements from the period of discovery to the present day. 115: the periods of conquest, colonial rule, and early independence. Includes works by native Indian, *mestizo*, and women writers. 116: from *modernismo* to the contemporary period. Not open to students who have taken Spanish 105,106. C-L: Comparative Area Studies. One course each. *Ross or staff*

117S. Spanish-American Short Fiction. (AL, FL) Novellas and short stories of the nineteenth and twentieth centuries: Martí, Darío, Quiroga, Borges, Cortázar, García Márquez, Allende, Ferré, Carpentier, and others. Not open to students who have taken Spanish 107S (Spanish-American Short Fiction). One course. *Pérez Firmat or staff*

120S. Contemporary European Issues. (CZ) An interdisciplinary seminar addressing topics of European culture. Taught in English. Offered only in the Duke in Madrid program. Consent of instructor required. One course. *Staff*

121. Latin-American Literature in Translation. (AL) Fictional and poetic works of the last thirty years that have made an impact on world literature. Taught in English. C-L: Comparative Area Studies and Literature 129. One course. *Dorfman*

131. Topics of Hispanic Civilization. (CZ, FL) A humanistic study of Spain or Spanish America through history, culture, people, and institutions. C-L: Comparative Area Studies. One course. *Staff*

137. Aspects of Contemporary Spanish Culture. (CZ, FL) Offered only as part of the summer program in Spain. C-L: Comparative Area Studies. One course. *Garci-Gómez*

141S, 142S. Spanish Literature. (AL, FL) Topics to be announced. Open to juniors and seniors. One course each. *Staff*

143S. Literature of the Discovery and Conquest of America. (AL, FL) Prose and poetry from the sixteenth through eighteenth centuries, exploring the idea of the New World from conquest to independence. C-L: Comparative Area Studies. One course. *Ross*

144S. Spanish-American Literature of Identity. (AL, FL) Exploration of the concepts of *lo criollo* or *lo americano*, essentially through the analysis of texts by Arriví, Carpentier, Neruda, Paz, and others. C-L: Comparative Area Studies. One course. *Pérez Firmat*

145S. Literature of the Hispanic Minorities of the United States. (AL, FL) Representative Spanish-language works by Puerto Rican, Cuban-American and Chicano writers. C-L: Comparative Area Studies. One course. *Pérez Firmat*

146. The Spanish-American Novel. (AL, FL) Masterworks of the twentieth century. C-L: Comparative Area Studies. One course. *Moreiras or staff*

147S. Latin American Women Writers. (AL, FL) Exploration of common themes across the region, such as family, love, feminism, and violence. May include only contemporary writers or cover authors from earlier periods as well. May study Brazilian writers in Spanish or in English translation. May concentrate on narrative or include poetry and drama. Open only to juniors and seniors. C-L: Comparative Area Studies and Women's Studies. One course. *Ross*

148. Colonial and Postcolonial Studies in Latin America and the Caribbean. (CZ, FL) Focus on Western colonial expansion since the sixteenth century and on the national periods, following the movement of independence. Cultural differences of colonial and

postcolonial experiences; transition from colonial to postcolonial regimes. Languages and literatures, history of ideas, cartography, and the social imaginary expressed in everyday life, from architecture to clothing, from rules of social behavior to ecological consciousness. Limited to juniors and seniors. One course. *Mignolo*

151. Spanish Literature of the Renaissance and the Baroque. (AL, FL) Selected works of the sixteenth and seventeenth centuries with attention to their reflection of social, religious, and political ideas. C-L: Medieval and Renaissance Studies. One course. *Ross or staff*

153. Golden Age Literature: Cervantes. (AL, FL) Emphasis on the *Quijote*. C-L: Medieval and Renaissance Studies. One course. *Staff*

169. Topics in Nineteenth- and Twentieth-Century Spanish Literature. (AL, FL) Focus on a specific genre or theme to be announced. One course. *Sieburth or staff*

171. Literature of Contemporary Spain. (AL, FL) A sociological approach to the novel, theater, and poetry: Goytisolo, Buero Vallejo, Sastre, Arrabal, Celaya, and Otero. C-L: Comparative Area Studies. One course. *Osuna*

175S. Hispanic Literature and Popular Culture. (AL, FL) Works of Spanish and Latin American fiction that parody or rewrite popular culture genres such as serial novels, detective stories, or Hollywood films. Authors include Cervantes, Galdós, Borges, Marsé, and Puig. One course. *Sieburth*

176S. Disenchanted Texts: Spanish Literature 1975-1990. (AL, FL) Study of some of the literary works written in Spain between 1975 (year of Franco's death) and 1990, a period of political transition and social disenchantment. How this specific disenchantment is present in literary texts as an expression of an unconscious and repressed mourning for the dictator as a father figure, as a nostalgia for a conflictive past, and as a confrontation with an uncertain present and future. Postdictatorship works of authors born in the 1920s and 1930s read alongside literary productions of the generation born after 1950. Authors include Goytisolo, Gil de Biedma, Vázquez Montalbán, Espinosa, Montero, Jaén, Ortiz, and others. One course. *Vilarós*

191, 192. Independent Study. Directed reading and research. Open only to qualified juniors by consent of instructor and director of undergraduate studies. One course each. *Staff*

193, 194. Independent Study. Directed reading and research. Open only to qualified seniors by consent of instructor and director of undergraduate studies. One course each. *Staff*

200S. Seminar in Spanish Literature. (AL, FL) Topics to be announced. One course. *Staff*

210. History of the Spanish Language. (FL) Formation and development. Internal forces and external contributions. C-L: Comparative Area Studies, Linguistics, and Medieval and Renaissance Studies. One course. *Garci-Gómez*

245. Modern Spanish-American Poetry. (AL, FL) From *modernismo* to the present. C-L: Comparative Area Studies. One course. *Staff*

248. Studies in Spanish-American Literature. (AL, FL) Concentration on single authors, genres, movements, or themes. One course. *Staff*

275. Modern Spanish Poetry. (AL, FL) Juan Ramón Jiménez, Unamuno, Antonio Machado, the Generation of 1927, and the contemporary poets. One course. *Osuna*

Courses Currently Unscheduled

- 133S. Spanish-American Civilization. (CZ, FL)
- 138S. The Spanish Civil War in History and Literature. (AL, FL)
- 163. The Generation of 1898. (AL, FL)
- 165S. Major Spanish Authors. (AL, FL)
- 166. Nineteenth-Century Prose Fiction. (AL, FL)
- 262. The Romantic Movement. (AL, FL)
- 276. Modern Spanish Drama. (AL, FL)
- 277. Modern Spanish Novel. (AL, FL)

ROMANCE STUDIES (RS)

Courses Currently Unscheduled

- 218. The Teaching of Romance Languages

THE MAJOR

Majors are offered in French Studies, Italian Studies, and Spanish. The French Studies and Spanish majors offer several different tracks, as described below.

Prerequisite. French, Italian, or Spanish 22, 76, or equivalents.

French Studies Major Requirements. The French Studies major offers two tracks: (1) French Studies and (2) French and European Studies.

(1) *French Studies.* *Prerequisites:* French 100 or equivalent (grade of A- or above in French 22 or 76, AP literature score of 5, achievement test score of 620 or above, or comparable linguistic experience). *The Major:* A total of eight courses from departmental French offerings numbered 101 or above. These must include two survey courses (either 101 or 105 and either 102 or 106), and at least three courses above the 140 level. Participation in Option Française courses is recommended when they are offered.

(2) *French and European Studies.* An interdisciplinary track requiring a total of ten courses. Seven courses must be from departmental French offerings numbered 101 or above. At least three of the seven French courses must be above the 140 level. Three courses on European topics (at or above the 100 level) must be taken in other departments (consult the undergraduate French advisor for the list of approved courses). Participation in Option Française courses is recommended when they are offered. Proficiency in another European language is highly desirable.

Italian Studies Major Requirements. A total of eight courses from departmental Italian offerings numbered 100 or above. These must include at least two Italian courses above 140. Up to three approved courses on Italian topics offered by other departments may be counted toward the major (consult the undergraduate Italian advisor for the list of approved courses).

Spanish Major Requirements. The Spanish major offers three tracks: (1) Spanish, (2) Spanish and Latin American Studies, and (3) Spanish and European Studies.

(1) *Spanish.* A total of eight courses from departmental Spanish offerings numbered above 100. These must include 101, any two of the survey sequences (111, 112, 115, 116) and at least three courses above 140.

(2) *Spanish and Latin American Studies.* An interdisciplinary track requiring a total of ten courses. Seven courses must be from departmental Spanish offerings numbered 101 or above. These must include 101, one survey course (115 or 116), and at least three Latin American literature or culture courses above 140. Three courses on Latin American

topics at or above the 100 level must be taken in other departments (consult the undergraduate Spanish advisor for the list of approved courses). A Brazilian literature course at or above the 100 level offered by the department may count as one of the courses taken within the department. Proficiency in Portuguese is highly desirable.

(3) *Spanish and European Studies*. An interdisciplinary track requiring a total of ten courses. Seven courses must be from departmental Spanish offerings numbered 101 or above. These must include 101, one survey course (111 or 112), and at least three Peninsular literature or culture courses above 140. Three courses on European topics at or above the 100 level must be taken in other departments (consult the undergraduate Spanish advisor for the list of approved courses). Proficiency in another European language is highly desirable.

Courses numbered 120 through 129 are taught in English and do not count toward the major (French and Spanish only). Course numbers 181 and 182 (now renumbered as 21, 22) do not count toward the major (French, Spanish, and Italian).

Study Abroad. Students are strongly urged to study abroad since this is the best way to achieve language proficiency and to acquire knowledge of a country's culture. A maximum of two courses per semester, or one per summer, may be counted toward the major. (The summer course restriction does not apply to Duke-administered programs.)

Suggested Work in Related Disciplines. In order to give perspective to a student's program, majors in French or Spanish will normally select, with the approval of the major advisor, appropriate courses from such fields as: (1) other languages and literatures; (2) history; (3) philosophy; (4) music and art; and (5) linguistics.

OPTION FRANÇAIS

Option Français is an offering of courses taught in French. Unlike the French courses offered by the Department of Romance Studies, however, in which language or literature is the essential subject matter, these are courses in various departments where French is simply the medium of instruction. Prerequisite: French SAT score of 600 (or the same score on the Placement Test), a score of 4 on the Advanced Placement Test in French, or prior completion of a French course numbered above 70. Option Français courses appear in the listings of the departments. They meet area of knowledge requirements as these are specified elsewhere in the undergraduate bulletin. They do not meet requirements for the major in French. Students interested in the program should consult the director of undergraduate studies in Romance studies.

Russian

For courses in Russian, see Slavic Languages and Literatures.

Science, Technology, and Human Values Program

Professor Vesilind, *Director*

A certificate, but not a major, is available in this program.

The Program in Science, Technology, and Human Values offers students the opportunity to develop a comprehensive view of science, medicine, or technology in social, historical, and ethical terms. Although a major is not available in this program, the course of study will enrich the understanding of one's profession for the future scientist, physician, or engineer, and for others it will broaden their appreciation of activities in these areas.

COURSE OF STUDY

Duke courses pertinent to the program are classified according to their approach: ethical, analytical (historical, philosophical, or sociological), or policy-centered. Each student entering the program designates, for purposes of advising, an

area of primary interest and then selects a program of five courses (four for engineering majors) covering all three approaches. Individual programs, selected from more than fifty courses, are tailored to each student's interests. Students in the program focus their course work and individual interests through an interdisciplinary seminar offered in the senior year (Interdisciplinary Course 108S). A seminar consisting of six varied topics in science, technology, and the humanities is offered as a course for undergraduates (Interdisciplinary Course 112S, 113S). Full details concerning the program and courses in science, technology, and human values may be obtained by writing or calling the director.

ELIGIBILITY AND CERTIFICATION

Students may apply to the program at any time. To students who complete the program, Duke University gives official recognition of their participation.

Slavic Languages and Literatures

Associate Professor Lahusen, *Chair*; Associate Professor Pugh, *Director of Undergraduate Studies*; Associate Professors Andrews and Dobrenko; Assistant Professor Gheith; Associate Professor Emeritus Jezierski; Assistant Professors of the Practice Dolgova, Flath, Maksimova, and Van Tuyl; Adjunct Associate Professor and Slavic Bibliographer Pelech

A major is available in this department.

RUSSIAN (RUS)

1-2. Elementary Russian. (FL) Introduction to understanding, speaking, reading, and writing. Audiolingual techniques are combined with required recording-listening practice in the language laboratory. Two courses. *Staff*

4, 5. Elementary Russian Conversation. (FL) Introduction to spoken Russian with emphasis on basic conversational style and increasing vocabulary. Half course each. *Staff*

14. Intensive Russian. (FL) Russian 1 and 2 combined in one semester. Two meetings daily, as well as daily computer and language laboratory work. Two courses. *Staff*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

61S, 62S. Intermediate Russian Language and Culture. (CZ, FL) Intensive classroom practice in phonetics, conversation, and grammar. Literature, films, museums, and theater performances. (Taught in St. Petersburg in Russian and English depending on placement.) Prerequisite: Russian 2 or equivalent. One course each. *Staff*

63, 64. Intermediate Russian. (FL) Intensive classroom and laboratory practice in spoken and written patterns. Reading in contemporary literature. Prerequisites: Russian 1 and 2, or two years of high school Russian. One course each. *Staff*

66, 67. Intermediate Russian Conversation. (FL) Consolidation of oral skills. Intensive conversation on a broad range of topics. Prerequisites: Russian 1 and 2, or equivalent. Half course each. *Staff*

70. Intensive Intermediate Russian. (FL) Russian 63 and 64 combined. Two meetings daily, as well as daily computer and language laboratory work. Two courses. *Staff*

100S. Russian Phonetics. (FL) Analysis of contemporary standard Russian literary pronunciation, phonology, and intonational structures. Prerequisite: Russian 64 or consent of instructor. One course. *Staff*

101S, 102S. Contemporary Russian Composition and Readings. (FL) Advanced grammar and syntax with intense composition component. Analytical readings in the original. Prerequisites: for 101S, Russian 63 and 64, or equivalent; for 102S, Russian 101S. One course each. *Staff*

103S, 104S. Studies in the Russian Language and Culture. (CZ, FL) Analytical readings including grammatical and textual analysis. Additional work in phonetics and conversation. Literature, films, museums, and theater performances. (Taught in St. Petersburg in Russian.) Prerequisite: Russian 64 or equivalent. C-L: Comparative Area Studies. One course each. *Staff*

110. Intensive Russian Composition and Readings. (AL, FL) Russian 101S and 102S combined in one course. Two meetings daily, as well as daily language laboratory work. Two courses. *Staff*

111S, 112S. Senior Honors Seminar. Introduction to methods of research and writing, including selection of thesis topics, preliminary research and organization, and writing of the thesis. Consent of the director of undergraduate studies required. One course each. *Staff*

119, 120. Topics in Slavic and Northern European Languages. (FL) Introduction to one of the following languages: Bulgarian, Serbo-Croatian, Ukrainian, or Finnish. One year of a foreign language recommended. C-L: Linguistics. One course each. *Staff*

121S, 122S. Introduction to Russian Literature. (AL, FL) Major works in Russian literature including prose and poetry. Prerequisite: Russian 63, 64 or equivalent. One course each. *Staff*

129. Russian Orthodoxy. (CZ) The belief systems and the history of the Russian Orthodox Church. The relationship between orthodoxy and Russian secular culture, including the response of several Russian writers. Taught in English. C-L: Religion 126. One course. *Pelech*

130. Soviet Cinema. (AL) History of Soviet film industry from silent to sound period. Overview of major theorist-filmmakers: Eisenstein, Pudovkin, Vertov. Issues of reception, audience, politics, form, national and ethnic identities. Taught in English. C-L: Film and Video and Literature 178. One course. *Gaines, Jameson, and Lahusen*

131. Language, Culture, and Myth: The Slavic Proverb. (AL) The sources of the Slavic proverb, the proverb as microtext of national stereotypes, and its function in modern literature and culture. Problems of translation. Taught in English. C-L: Comparative Area Studies. One course. *Dolgorova*

135. Contemporary Russian Media. (FL, SS) Analytical readings and study of change and development in all the primary forms of mass media in the former Soviet Union from 1985 to present (newspapers, journals, and television). Topics include censorship, TASS, samizdat. Taught in English, readings in Russian. Prerequisite: Russian 64 or equivalent. C-L: Comparative Area Studies. One course. *Andrews*

141, 142. Teaching Practicum. Introduction to teaching Russian. Practical classroom teaching experience in local elementary schools. Weekly sessions on teaching methodology. Consent of instructor required. One course each. *Andrews*

150. The Languages of the Soviet Union. (FL) Structural survey of the various language families represented in the former U.S.S.R., with special emphasis on national language policy, bilingualism, and language contact. Taught in English. C-L: Comparative Area Studies and Linguistics. One course. *Pugh*

155. The Interaction of Russian and American Culture. (AL) Addresses the broad, interdisciplinary issue of identity and otherness while studying specifically what hap-

pens when the cultures of Russia and the United States come into contact. Taught in English. C-L: Comparative Area Studies. One course. *Lahusen and Van Tuyl*

161, 162. Nineteenth-Century Russian Literature. (AL) Selected nineteenth-century authors, works, and genres. Authors include Pushkin, Lermontov, Gogol, Turgenev, Dostoevsky, Tolstoy, and Chekhov. Taught in English. C-L: Comparative Area Studies. One course each. *Staff*

163. Literature of Former Soviet Republics. (AL) Ukrainian realism of the nineteenth century, futurism, neoclassicism, and the literary struggle of the 1920s; Belorussian literature; Lithuanian psychological prose; the Estonian experimental novel; Georgian literature from Rustaveli to the philosophical novel of the 1970s; the work of Chingiz Aitmatov; Soviet "recent literacy." Taught in English. C-L: Comparative Area Studies. One course. *Dobrenko*

165S. Old Russian Literature. (AL) Literary works from the thirteenth to the eighteenth centuries. Taught in English. One course. *Staff*

168S. Russian Classical Literature and Music. (AL) The interaction of literary and musical texts. Includes literary texts by Pushkin, Lermontov, Gogol, Leskov and musical texts (operas) by Chaikovsky, Borodin, Glinka, Musorgskiy, Rimsky-Korsakov, Rubinstein, and Shostakovich. Taught in English. C-L: Comparative Area Studies. One course. *Dobrenko*

169. Women and Russian Literature. (AL) Women authors in Russia from the eighteenth century to the present: their works and lives. The role that works by women have played in Russian literature and culture. The question of whether women's writing in Russia constitutes a tradition. Authors include Dashkova, Catherine the Great, Kovalevskaya, Kollontai, Chukovskaya, Akhmatova, Petrushevskaya, and Tolstaya. Taught in English. C-L: Comparative Area Studies and Women's Studies. One course. *Gheith*

170. Russian Dissident and Emigré Literature. (AL) The literature of opposition in Russia during the nineteenth and twentieth centuries, from Chaadaev and Chernyshevsky to Grossman, Solzhenitsyn, and Zinoviev. Taught in English. C-L: Comparative Area Studies. One course. *Lahusen*

172S. Pushkin and His Time. (AL) Pushkin and the literary revolution around 1830. Prose works (*The Tales of Belkin*, *The Queen of Spades*, *The Captain's Daughter*) and major lyrical poetry. Taught in English. C-L: Comparative Area Studies. One course. *Gheith or Van Tuyl*

173S. Gogol. (AL) Life, works, and criticism. Readings include *Dead Souls*, *The Inspector General*, *Petersburg Tales*, and other short fiction. Taught in English. C-L: Comparative Area Studies. One course. *Lahusen*

175. Tolstoy. (AL) Introduction to life, works, and criticism. Readings include: *War and Peace*, *Anna Karenina*, the shorter fiction, dramatic works and essays. Taught in English. C-L: Comparative Area Studies. One course. *Van Tuyl*

176. Dostoevsky. (AL) Introduction to life, works, and criticism. Readings include: *Crime and Punishment*, *The Idiot*, and *The Brothers Karamazov*. Taught in English. C-L: Comparative Area Studies. One course. *Flath, Gheith, or Van Tuyl*

177S. Chekhov. (AL) Drama and prose works. Taught in English. Not open to students who have taken Russian 174S (Chekhov). C-L: Comparative Area Studies. One course. *Flath or staff*

178. Russian Short Fiction. (AL) The history, development, and shifts of Russian short fiction in the nineteenth and twentieth centuries. Authors include Dostoevsky,

Vovchok, Leskov, Chekhov, Gippius, and Zoshchenko. Topics include gender, genre, and national identity in historical/cultural context. Taught in English. C-L: Comparative Area Studies. One course. *Gheith*

179S. Selected Topics in Russian Literature. (AL) Women writers of the twentieth century, Soviet film, *samizdat/tamizdat*, the Petersburg paradigm in Russian literature and culture. Taught in English. One course. *Staff*

180. Early Twentieth-Century Russian Literature: From Symbolism to the 1920s. (AL) Symbolism, acmeism, futurism, imagism, proletarian literature. Authors include Bely, Sologub, Blok, Vyacheslav Ivanov, Akhmatova, Mandelshtam, Mayakovsky, Khlebnikov, Gorky, Bogdanov, Gastev. Taught in English. C-L: Comparative Area Studies. One course. *Lahusen or staff*

181. The 1920s: The Road to a New Synthesis. (AL) The literary struggle of the 1920s; proletarian literature from the Smyth to RAPP, LEF and the fate of the avant-garde, the aesthetic conception of Pereval, the literature of the absurd, Oberiu and the Serapion Brothers. Authors include Kirillov, Gladkov, Babel, Pilnyak, Olesha, Zamyatin, Platonov, Kharms, and Pasternak. Taught in English. Not open to students who have taken the former Russian 181, Early Twentieth-Century Russian Literature. C-L: Comparative Area Studies. One course. *Dobrenko or Lahusen*

182. Socialist Realism: Soviet Literature of the 1930s and 1940s. (AL) The Stalin era of Russian literature, the genesis and development of socialist realism, Soviet literature and the themes of boundaries and war. Authors include Sholokhov, Ostrovsky, Fadeev, Azhnev, Babaevsky, Kochetov, and Simonov. Taught in English. C-L: Comparative Area Studies. One course. *Dobrenko or Lahusen*

183. Post-Stalinist and Contemporary Soviet Literature. (AL) Literature of the thaw after Stalin: the young prose, little realism, new modernism, and rural prose. Authors include Aksyonov, Trifonov, Baranskaya, Bitov, Solzhenitsyn, Rasputin, Shukshin, and Zalygin. Taught in English. C-L: Comparative Area Studies. One course. *Dobrenko or Lahusen*

184. Literature under and after Glasnost. (AL) From the "recovered" avant-garde to the new literature during the Gorbachev era and beyond. The unmasking of Soviet history and its aestheticization. Underground literature and Soviet postmodernism. Authors include Rybakov, Pietsukh, Petrushevskaya, Kuraev, Tolstaya, Viktor Erofeev, Makanin, Prigov, and Narbikova. Readings in English. C-L: Comparative Area Studies and Linguistics. One course. *Dobrenko, Gheith, or Lahusen*

185S. Introduction to Slavic Linguistics. (FL) Basic introduction to linguistic terminology; emphasis on synchronic linguistic theory in the East, West, and South Slavic areas. Phonological, morphological, and syntactic structure of contemporary standard Russian. Readings in English and Russian. C-L: Comparative Area Studies and Linguistics. One course. *Andrews*

186S. History of the Russian Language. (FL) The development of the Russian language from the eleventh century, with consideration of the origins of modern literary and dialectal features. Readings in Russian. Prerequisite: second year Russian or consent of instructor. C-L: Comparative Area Studies and Linguistics. One course. *Pugh*

188S, 189S. Advanced Russian Language and Culture. (CZ, FL) Advanced grammar review with additional emphasis on phonetics and conversation. Literature, films, museums, and theater performances. (Taught in St. Petersburg in Russian.) Prerequisite: Russian 102S or equivalent. C-L: Comparative Area Studies. One course each. *Staff*

190. Introduction to Russian Civilization. (CZ) Basic knowledge of Russian society, history of ideas, folklore tradition, orthodoxy, and history of Russian readership. Taught in English. C-L: Comparative Area Studies and History 146. One course. *Pelech*

191, 192. Independent Study. Directed reading and research. Open only to qualified students by consent of director of undergraduate studies. One course each. *Staff*

193, 194. Independent Study. Directed reading and research for qualified seniors. Consent of director of undergraduate studies required. One course each. *Staff*

195. Advanced Russian. (FL) Advanced grammar review with an emphasis on the refinement of oral and written language skills. Development of writing style through compositions and essays. Prerequisite: Russian 102S or consent of instructor. C-L: Comparative Area Studies. One course. *Andrews*

196. Advanced Russian: Readings, Translation, and Syntax. (FL) Intensive reading and conversation with emphasis on contemporary Russian literary and Soviet press texts. English-Russian translation stressed. Russian media, including television and films. Prerequisite: Russian 195 or consent of instructor. C-L: Comparative Area Studies. One course. *Andrews*

197. Russian Poetry. (AL) Focus on nineteenth and twentieth centuries, including the Golden Age and the Silver Age. Authors include Pushkin, Lermontov, Bely, Blok, Akhmatova, Tsvetaeva, Mandelshtam, Pasternak, and Mayakovsky. Taught in English or Russian, according to students' Russian language proficiency. Russian texts. One course. *Staff*

198, 199. Russian Stylistics and Conversation. (AL, FL) Refinement of stylistic control and range in spoken and written Russian. Emphasis on fluent discursive skills, as well as development of expository prose style. Prerequisites: Russian 195 and 196, or consent of instructor. One course each. *Maksimova*

For Seniors and Graduates

201S. Topics in Comparative Slavic Linguistics. (SS) A cycle of survey courses on the phonology, morphology, and dialects of the Slavic languages. Taught in English. Readings in Russian. A. East Slavic B. West Slavic C. South Slavic D. Common Slavic C-L: Linguistics. One course. *Andrews or Pugh*

203S. Old Church Slavonic. (FL) Introduction to the language of the earliest Slavic texts. Close study of phonological and morphological systems, reading of texts and discussion. Taught in English. C-L: Linguistics and Religion 229S. One course. *Pugh*

204S. Russian Folklore and Popular Culture. (CZ, FL) Work songs and ritual songs, lamentations, riddles, and proverbs. Tales and later forms of popular creation (*chastushki*, anecdotes, urban romance) and their function in Russian culture. Taught in Russian. One course. *Dolgora*

205. Semiotics and Linguistics. (SS) A survey of modern semiotics, particularly the works of C. S. Peirce and Umberto Eco. Semiotic works directly related to modern linguistic thought and linguistic sign theory. Emphasis on the interdisciplinary aspects of semiotic theory. C-L: English 205 and Linguistics. One course. *Andrews (Slavic)*

207S. Semantics. (SS) Survey of modern semantic theory, including a range of theoretical approaches: communication theory, structuralism, markedness, and generative semantics. Emphasis on lexical meaning and deictic relations. Taught in English. C-L: Linguistics. One course. *Andrews*

208. Stylistic and Compositional Elements of Scholarly Russian. (FL) Introduction to Russian texts and terminology including business, economics, law, history, political

sciences, psychology, linguistics, and literary criticism. Prerequisite: Russian 64 or consent of instructor. One course. *Maksimova*

210. Literature and Criticism of Socialist Realism. (AL) The genesis and development of Soviet socialist realism. A survey of Soviet literary theories from Lunacharsky to Ovcharenko, and contemporary Western criticism (for example, K. Clark, R. Robin). A critical approach to the dialogic alternative to monologic literature through literary illustration (selected Soviet literary works from the 1930s to the present day). Taught in English. One course. *Lahusen*

230. Soviet Cinema. (AL) History of Soviet film industry from silent to sound period. Overview of major theorist-filmmakers: Eisenstein, Pudovkin, Vertov. Issues of reception, audience, politics, form, national and ethnic identities. Taught in English. One course. *Gaines, Jameson, and Lahusen*

240S. Russian Literary Discourse. (AL) Nineteenth- and twentieth-century Russian literary theory, with close readings in the original. Application to fiction. Taught in English. One course. *Lahusen*

250. Trends in Russian and East European Literary Criticism and Beyond. (AL) The major critical movements in the nineteenth and twentieth centuries in Russia, East-Central Europe, and the West. Authors and theories include the Belinsky school, formalism, Bakhtin, structuralism, semiotics, and psychoanalytic and feminist theory. Taught in English. One course. *Gheith*

261, 262. Nineteenth-Century Russian Literature. (AL) Selected nineteenth-century authors, works, and genres. Authors include Pushkin, Lermontov, Gogol, Turgenev, Dostoevsky, Tolstoy, and Chekhov. Taught in English. Readings in Russian. One course each. *Staff*

265S. Literature of Early Russia. (AL) Works from the eleventh to the seventeenth centuries, including Ilarion's *Sermon on Law and Grace*, *The Tale of Bygone Years*, *The Igor Tale*, *Domostroi*, *Avvakum's Life*. Readings in Russian. One course. *Dolgoroa and staff*

266S. The Sources of Modern Russian Literature: The Eighteenth Century. (AL) Development of the major forms of Russian literature, including verse, drama, and the beginnings of the prose tradition. Authors include Kantemir, Lomonosov, Sumarokov, Trediakovsky, Fonvizin, Derzhavin, and Karamzin. Readings in Russian. One course. *Gheith*

269. Women and Russian Literature. (AL) Women authors in Russia from the eighteenth century to the present: their works and lives. The role that works by women have played in Russian literature and culture. The question of whether women's writing in Russia constitutes a tradition. Authors include Dashkova, Catherine the Great, Kovalevskaia, Kollontai, Chukovskaia, Akhmatova, Petrushevskaia, and Tolstaia. Taught in English. Readings in Russian. C-L: Comparative Area Studies and Women's Studies. One course. *Gheith*

272S. Pushkin and His Time. (AL) Pushkin and the literary revolution around 1830. Prose works (*The Tales of Belkin*, *The Queen of Spades*, *The Captain's Daughter*) and major lyrical poetry. Taught in English. Readings in Russian. One course. *Gheith or Van Tuyl*

273S. Gogol. (AL) Life, works, and criticism. Readings include *Dead Souls*, *The Inspector General*, *Petersburg Tales*, and other short fiction. Readings in Russian. One course. *Lahusen*

275. Tolstoy. (AL) Introduction to life, works, and criticism. Readings include: *War and Peace*, *Anna Karenina*, the shorter fiction, dramatic works and essays. Taught in English. Readings in Russian. One course. *Van Tuyl*

276. Dostoevsky. (AL) Introduction to life, works, and criticism. Readings include: *Crime and Punishment*, *The Idiot*, and *The Brothers Karamazov*. Taught in English. Readings in Russian. C-L: Comparative Area Studies. One course. *Flath, Gheith, or Van Tuyl*

277S. Chekhov. (AL) Drama and prose works. Readings in Russian. One course. *Flath*

278. Russian Short Fiction. (AL) The history, development, and discontinuities of Russian short fiction in the nineteenth and twentieth centuries. Authors include Dostoevsky, Vovchok, Leskov, Chekhov, Gippius, and Zoshchenko. Topics include gender, genre, and national identity in historical/cultural context. Taught in English. C-L: Comparative Area Studies. One course. *Gheith*

279S. Literature of the Former Soviet Republics. (AL) Ukrainian realism of the nineteenth century, futurism, neoclassicism, and the literary struggle of the 1920s; Belorussian literature; Lithuanian psychological prose; the Estonian experimental novel; Georgian literature from Rustaveli to the philosophical novel of the 1970s; the work of Chingiz Aitmatov; Soviet "recent literacy." Taught in Russian. One course. *Dobrenko*

280. Early Twentieth-Century Russian Literature: From Symbolism to the 1920s. (AL) Symbolism, acmeism, futurism, imagism, proletarian literature. Authors include Bely, Sologub, Bryusov, Blok, Vyacheslav Ivanov, Khodasevich, Akhmatova, Mandelshtam, Mayakovsky, Khlebnikov, Gorky, Bogdanov, Gastev. Readings in Russian. One course. *Lahusen*

281. The 1920s: The Road to a New Synthesis. (AL) The literary struggle of the 1920s; proletarian literature from the Smithy to RAPP, LEF and the fate of the avant-garde, the aesthetic conception of Pereval, the literature of the absurd, Oberiu and the Serapion Brothers. Authors include Kirillov, Gladkov, Babel, Pilnyak, Olesha, Zamyatin, Platonov, Kharns, and Pasternak. Readings in Russian. One course. *Dobrenko or Lahusen*

282. Socialist Realism: Soviet Literature of the 1930s and 1940s. (AL) The Stalin era of Russian literature, the genesis and development of socialist realism, Soviet literature and the theme of boundaries and war. Authors include Sholokhov, Ostrovsky, Fadeev, Azhaev, Babaevsky, Kochetov, and Simonov. Readings in Russian. One course. *Dobrenko or Lahusen*

283. Post-Stalinist and Contemporary Soviet Literature. (AL) Literature of the thaw after Stalin: the young prose, little realism, new modernism, and rural prose. Authors include Aksyonov, Trifonov, Baranskaya, Bitov, Solzhenitsyn, Rasputin, Shukshin, and Zalygin. Readings in Russian. C-L: Comparative Area Studies. One course. *Dobrenko or Lahusen*

284. Literature under and after Glasnost. (AL) From the "recovered" avant-garde to the new literature during the Gorbachev era and beyond. The unmasking of Soviet history and its aestheticization. Underground literature and Soviet postmodernism. Authors include Rybakov, Pietsukh, Petrushevskaya, Kuraev, Tolstaya, Viktor Erofeev, Makarin, Prigov, and Narbikova. Readings in Russian. One course. *Dobrenko, Gheith, or Lahusen*

285. Babel and the Russian-Jewish Cultural Dialogue of the Twentieth Century. (AL) The Jews and the Russian revolution. The Odessa school in the literature of the 1920s. Works include *Red Cavalry*, *Odessa Stories*, and *The Sunset*. Readings in English or Russian. One course. *Dobrenko*

286S. Zamyatin. (AL) The novel *We*, short fiction, and essays. Taught in English. Readings in English or Russian. Not open to students who have taken the former Russian 177S/277S (Zamyatin). One course. *Andrews, Maksimova, or Lahusen*

287S. Platonov. (AL) The novels *Chevangur*, *The Foundation Pit*, and shorter fiction. Taught in English. Readings in English or Russian. One course. *Lahusen*

288S. Bulgakov. (AL) Works include *Master and Margarita*, *The White Guard*, *A Theatrical Novel*, and *The Heart of a Dog*. Readings in English or Russian. One course. *Andrews, Maksimova, and staff*

290. Trifonov, or the Life and Death of the Soviet Intelligentsia. (AL) The Russian and Soviet intelligentsia, its role and historical responsibility, depicted by one of the most visible representatives of the "generation of the sixties." Works include *The Exchange*, *Taking Stock*, *The Long Goodbye*, *Another Life*, *The House on the Embankment*, *The Old Man*. Readings in Russian. One course. *Dobrenko*

298. Akhmatova. (AL) The works and times of Anna Akhmatova, the most prominent woman poet in Russian history. Focus on Akhmatova's works and the Russian political and artistic milieu of the 1910s and 1920s, socio-literary issues of later periods. Readings include the lyric poems of 1910-60, *Requiem*, and *Poem Without a Hero*. Readings in Russian. One course. *Van Tuyl*

BALTO-FINNIC (BF)

1-2. Elementary Estonian. (FL) Introduction to understanding, speaking, reading, and writing Estonian. No preliminary knowledge of Estonian necessary. Two courses. *Pugh*

3-4. Elementary Finnish. (FL) Introduction to understanding, speaking, reading, and writing Finnish. No preliminary knowledge of Finnish necessary. Two courses. *Pugh*

200. Balto-Finnic Linguistics. (FL) Introduction to Balto-Finnic languages with emphasis on the established literary languages, Finnish and Estonian. Analysis of their phonological and morphological structures. Survey of related nonliterary languages such as Karelian and Vepsian. Taught in English. C-L: Linguistics. One course. *Pugh*

POLISH (POL)

1-2. Elementary Polish. (FL) Introduction to understanding, speaking, reading, and writing Polish. No preliminary knowledge of Polish necessary. Two courses. *Lahusen*

14. Intensive Elementary Polish. (FL) Polish 1 and 2 combined in one semester. Two meetings daily. Required recording-listening practice in the language laboratory. Work on understanding, speaking, reading, and writing. Survey of main elements of grammar. No preliminary knowledge of Polish necessary. Two courses. *Lahusen and staff*

63, 64. Intermediate Polish. (FL) Intensive classroom and laboratory practice in spoken and written patterns. Readings in contemporary literature. Prerequisites: Polish 1 and 2, or consent of instructor. One course each. *Lahusen*

187. Introduction to Polish Literature. (AL) Survey of nineteenth- and twentieth-century Polish literature. Taught in English. C-L: Comparative Area Studies. One course. *Lahusen*

Courses Currently Unscheduled

100. Poland in Transition. (CZ)

174S. Topics in Polish Literature. (AL)

SERBIAN AND CROATIAN (SCR)

1-2. Elementary Serbian and Croatian. (FL) Introduction to understanding, speaking, reading, and writing Serbian and Croatian. No preliminary knowledge of Serbian and Croatian necessary. Two courses. *Andrews*

14. Intensive Elementary Serbian and Croatian. (FL) Serbian and Croatian 1 and 2 combined in one semester. Two meetings daily. Required recording-listening practice in the language laboratory. Work on understanding, speaking, reading, and writing. Survey of main elements of grammar. No preliminary knowledge of Serbian and Croatian necessary. Two courses. *Andrews*

UKRAINIAN (UKR)

1-2. Elementary Ukrainian. (FL) Introduction to understanding, speaking, reading, and writing Ukrainian. No preliminary knowledge of Ukrainian necessary. Two courses. *Dobrenko or Pugh*

14. Intensive Elementary Ukrainian. (FL) Ukrainian 1 and 2 combined in one semester. Two meetings daily. Required recording-listening practice in the language laboratory. Work on understanding, speaking, reading, and writing. Survey of main elements of grammar. No preliminary knowledge of Ukrainian necessary. Two courses. *Dobrenko or Pugh*

187. Introduction to Ukrainian Literature. (AL) Nineteenth- and twentieth-century Ukrainian literature. Taught in English or Russian. C-L: Comparative Area Studies. One course. *Dobrenko*

THE MAJOR

Prerequisites. Russian 1-2 and 63, 64 or equivalent.

Major Requirements. A minimum of eight courses in the department. All majors must take the following courses: Russian 101S, 102S, 195, 196. Each major is required to take one course in nineteenth-century Russian literature and one course in twentieth-century Russian literature. Two areas of specialization are offered. Students contemplating graduate work are strongly encouraged to choose from one of the two following concentrations within the standard major.

Literature Concentration: either 121 or 122; and one other course to be approved by the department.

Linguistics Concentration: Both 185S and 186S.

Sociology (SOC)

Professor Land, *Chair*; Professor Wilson, *Director of Undergraduate Studies*; Professors DiPrete, Lin, Maddox, Myers, Simpson, Smith, and Tiryakian; Associate Professors Gereffi, O'Rand, and Spenner; Assistant Professors Gao, Jackson, Janoski, Parnell, and Thornton; Professors Emeriti Back, Kerckhoff, and Preiss; Assistant Professor of the Practice Luttrell; Adjunct Professors Cook (public policy), George (psychiatry and aging center), Lewin (business), and O'Barr (cultural anthropology); Adjunct Associate Professors Haveman (business) and Weinberger (medicine and aging center); Adjunct Assistant Professors Boychuk (health policy research and education) and Gold (psychiatry and aging center); Adjunct Research Professor Manton (demographic studies); Visiting Professor Gittler

A major is available in this department.

Sociology combines an appreciation of human beings' capacity for self-realization with a scientific understanding of the causes and consequences of their social behavior. Each course aims to develop both the analytical and critical skills necessary for understanding and evaluating social institutions and social change. Emphasis is upon contemporary research and the use of sociological data in tackling social problems. Active involvement in the learning process is fostered through seminars, independent study, honors work, and internships.

10D. Introduction to Sociology. (SS) Structure and dynamics of groups, organizations, and institutions; social behavior over the life cycle; social control and deviance; population and social ecology; formation and change of societies. Two lectures and one discussion section. One course. *O'Rand or Parnell*

11. Contemporary Social Problems. (SS) A survey of approaches to the study of current social problems and social trends. Sexism, racism, age discrimination; job displacement by technological change; social consequences of environmental pollution; unemployment and poverty; interpersonal problems associated with changes in family structures; maldistribution of health care and educational opportunities; deviance. One course. *Land*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

98. Introduction to Canada. (SS) See C-L: Interdisciplinary Course 98; also C-L: Canadian Studies, Economics 98, History 98, and Political Science 98. One course. *Leclerc or Thompson*

101B, S. Science and Technology in Twentieth-Century America. (SS) Science and technology as embedded in social and political institutions that constrain and promote their development over time. The complex and dynamic set of relations during the twentieth century across scientific and technological domains (for example, cybernetics, atomic energy, and biotechnology). Particularly controversial events and theories that illustrate these relations. Open only to students in the FOCUS Program. One course. *O'Rand*

101S. Contemporary American Society. (SS) Social trends and problems and their effects on individuals and society. Urbanization; bureaucracy; distribution of wealth, income, and power; status of minorities. One course. *Simpson or Spenner*

106. Social Psychology. (SS) See C-L: Psychology 116; also C-L: Women's Studies. One course. *Costanzo, Fischer, or George*

110, A-E. Comparative Sociology: Selected Areas. (SS) Comparative studies of selected areas of the world, considering differences and similarities in culture and communication, family, law and social control, urban forms and the organization of work. Areas vary each semester offered and are designated by letter.

A. Africa

B. Asia

C. Europe

D. Latin America

E. Cross-Regional

C-L: Comparative Area Studies. One course. *Gao, Gereffi, Janoski, Lin, Myers, Smith, or Tiryakian*

111. Inequality in America. (SS) Differences in social position in the United States as they relate to income, prestige, and power. Primary focus on the process of achievement, including level of education and occupational position, while controlling for race, sex, and age. C-L: Women's Studies. One course. *Jackson or O'Rand*

112. American Demographics. (SS) Examination of trends in the fertility, migration, geographic distribution, and composition of the United States population. Consequences for lifestyles, social trends, consumer markets, health care, and public policy. One course. *Land, Myers, or Parnell*

116. Race and Ethnic Relations. (SS) History and changing nature of race and ethnic relations, with special reference to the United States. Sources, forms, and consequences of racial discrimination; movements for racial integration and separatism; the intersec-

tion of race, class, and gender. C-L: African and Afro-American Studies 116. One course. *Jackson*

117. Childhood in Social Perspective. (SS) Social forces affecting the place and purpose of children in society, their relations to adults and their treatment by social institutions such as schools and governments. Topics include parent-child relations, sibling relations, child abuse, children's rights, child labor, and the portrayal of children in the mass media. One course. *Simpson*

118. Sex, Gender, and Society. (SS) Nature and acquisition of sex roles. Cross-cultural variations. Developing nature of sex roles in American society. C-L: Comparative Area Studies and Women's Studies. One course. *O'Rand*

119. Juvenile Delinquency. (SS) Environments in which juvenile delinquency develops; delinquent subcultures and peer groups; societal reactions to delinquency in schools, courts, and other agencies. One course. *Land*

Sociology 120, 122, and 123 are designed as a sequence and might optimally be taken in that order, with Sociology 120 being recommended preparation for 122 and 123. However, there are no prerequisites.

120. Causes of Crime. (SS) Definition, types, and extent of crime; biological, psychological, economic, and social causes of criminality; explanation and critical evaluation of theories of crime; structure and patterns of recruitment of criminal organizations; social reactions to crime and the justice system. One course. *Land*

122. Punishment and Treatment of Deviants. (SS) Concepts of punishment and rehabilitation. Programs and facilities for deviants. Structure and operation of "total" institutions, such as prisons and hospitals. Problems of returning to family and community life. One course. *Staff*

123. Social Aspects of Mental Illness. (SS) Theoretical and practical sociological contributions to problems of etiology, definition, law, and treatment; comparisons with other contributions; questions of public policy and programs. One course. *George or Jackson*

124. Human Development. (SS) Especially for sophomores. Juniors and seniors by consent only. See C-L: Interdisciplinary Course 124; also C-L: Human Development and Psychology 124. One course. *Anderson, Gustafson, and staff*

125. Strategies of Comparative Analysis. (SS) See C-L: Comparative Area Studies 125; also C-L: Cultural Anthropology 125, History 137, Political Science 125, and Religion 121. One course. *Gereffi or Janoski*

126. Third World Development. (SS) Theories concerning the role of transnational corporations and international financial institutions (for example, World Bank) in the development of Third World nations, assessed with the aid of sociological and economic data. C-L: Comparative Area Studies. One course. *Gereffi or Parnell*

132. Methods of Social Research. (SS) Principles of social research, design of sociological studies, sampling, and data collection with special attention to survey techniques. One course. *DiPrete or Lin*

133. Statistical Methods. (QR) Elementary statistical techniques and their application to the analysis and interpretation of social science data. Theory of inference is stressed. C-L: Psychology 117. One course. *Land or Spenner*

135. Computers and Society. (SS) The impact of the computer and related technologies on society. Topics include the effects on individual freedom and the nature of work,

the implications of high speed information retrieval, and others. One course. *Smith or Spenner*

138. History of Social Thought. (SS) Theories of society and social relations in the writings of Montesquieu, Rousseau, Comte, Marx, Weber, Durkheim, Simmel, Veblen, Sorokin, and others. The history of sociology in relation to philosophical currents, social movements, and transformation of the modern world. One course. *Tiryakian or Wilson*

139. Marxism and Society. (SS) See C-L: Cultural Anthropology 139; also C-L: Comparative Area Studies, Education 139, History 186, Interdisciplinary Course 139, and Literature 139. One course. *Staff*

142. Organizations and Global Competitiveness. (SS) Competition between national economies as understood in the context of social factors such as ethnicity, kinship, gender, education, with a special emphasis on the role of multi-national corporations, public bureaucracies, and small firms. One course. *Gereffi*

143. Management and Labor Relations. (SS) Theories and current research on the interlocking roles of business and labor in the United States and elsewhere. One course. *Gereffi, Janoski, or Thornton*

144. Organizations and Environments. (SS) How organizations (governments, cultures, and technology) are affected by the environment in which they must operate. Competitive strategies (for example, takeovers and mergers); corporate cultures (for example, United States versus Japan); and the impact of technology. One course. *Gao or Thornton*

149. Sexuality and Society. (SS) Sociocultural factors affecting sexual behavior. Changing beliefs about sex; how sexual knowledge is socially learned and sexual identities formed; the relation between power and sex; control over sexual expression. One course. *Luttrell or Tiryakian*

150. The Changing American Family. (SS) Structure, organization, and social psychology of marital, parental, and sibling relations over the life cycle of a family; courtship, marriage, family dissolution in relation to contemporary American society; deviations from and alternatives to the traditional nuclear family. C-L: Women's Studies. One course. *Simpson*

151. Sociology of Religion. (SS) The religious factor in modern society and the social factor in modern religion. Major sociological theories and marginal religious groupings. One course. *Tiryakian or Wilson*

153. Sport and Society. (SS) The effect of sports on people, their self-image, and social roles. Relation of sports as an institution to the family, education, economics, and politics. One course. *Wilson*

154. Art and Literature in Society. (SS) An analysis of the social relations of the world of the arts (painting and sculpture, music, and literature) with emphasis upon creative artists, art publics, art organizations, and artworks as they function in their social-cultural milieux. One course. *Luttrell or Tiryakian*

155. Organizations and Management. (SS) Forms of work organization (corporations, government agencies), the social forces shaping them (management styles, technology, government policy, labor markets), and their effects on employees (productivity, work satisfaction, turnover). C-L: Women's Studies. One course. *DiPrete, Janoski, or Thornton*

156. Global Contexts of Science and Technology. (SS) National variations in the structures of scientific systems, and their consequences for the production and application of scientific knowledge, paying particular attention to how these variations are

shaped by national differences in politics, economics, and education. Special focus on recent developments in the biomedical sciences, such as genetic engineering and biotechnology. One course. *O'Rand*

157. The Legal Profession and the Law. (SS) Development of the American legal profession, emphasizing the recruitment and training of lawyers, the ways lawyers' work is organized, the role of professional associations, the determinants of success in legal practice, and the influence of legal ethics on practice. One course. *Simpson or Wilson*

158. Markets and Marketing. (SS) Markets as systems of social exchange: how they are organized and developed; their relationship to other social structures such as families, work organizations, and the state; their impact on individuals, careers, consumption patterns, and lifestyles. One course. *DiPrete or Spenner*

159. The Sociology of Entrepreneurship. (SS) The social origins and careers of entrepreneurs. The interrelation of their work and family roles and the distinctiveness of their values and interests. The role of entrepreneurial activity in societal development, and its function in different industries, ethnic groups, and societies. One course. *Thornton*

160. Advertising and Society. (SS) See C-L: Cultural Anthropology 110; also C-L: English 120, Film and Video, and Women's Studies. One course. *Luttrell, O'Barr, J. Smith, or Wilson*

161. Adulthood and Aging. (SS) Sociological and psychological perspectives on aging, from adolescence through old age and death; demography of human aging; problems caused by increased longevity; policy issues. C-L: Women's Studies. One course. *George, Gold, or O'Rand*

162. Health and Illness in Society. (SS) Relations between patients and health professionals, and utilization of resources for health care. One course. *Lin or Weinberger*

163. Aging and Health. (SS) Illness and health care utilization among the elderly, comparison to other populations, gender and race differences, medicare and medicaid, individual adjustment to aging and illness, social support for sick elderly, the decision to institutionalize, policy debate over euthanasia. One course. *George or Gold*

165. Occupations, Professions, and Careers. (SS) How occupations organize and control labor markets, define services, chart career lines, and develop and sustain occupational identities. C-L: Women's Studies. One course. *O'Rand, Simpson, or Spenner*

167. The Social Bases of Politics. (SS) Theories of and research on political power at the community, national, and international levels. C-L: Canadian Studies and Women's Studies. One course. *Gereffi or Smith*

169. Psychosocial Aspects of Human Development. (SS) See C-L: Psychology 130; also C-L: Human Development and Interdisciplinary Course 180. One course. *Martin Lakin and Maddox*

170. Mass Communication. (SS) An analysis of the role of radio, the press, magazines, movies, and television. An examination of the selective audiences, content characteristics, controlling elements, and organizational structure of the various media. Comparative Canadian material considered where feasible. C-L: Canadian Studies, Comparative Area Studies, and Film and Video. One course. *Smith*

171. Comparative Health Care Systems. (SS) The interaction of historical, political, economic, legal/ethical, and sociological factors in the organization and operation of health care systems in the United States, the United Kingdom, Sweden, and elsewhere. C-L: Canadian Studies and Comparative Area Studies. One course. *Maddox*

175. Contemporary Global Issues. (SS) See C-L: Comparative Area Studies 109; also C-L: Cultural Anthropology 109, History 109, and Political Science 160. One course. *Staff*

179. Modern Nationalist Movements. (SS) A comparative sociological study of major nationalist movements. First World nationalism in industrial societies, Third World nationalism in colonial and postcolonial societies, and recent Second World nationalism in socialist societies. C-L: Canadian Studies and Comparative Area Studies. One course. *Tiryakian*

182. Media in Comparative Perspective. (SS) See C-L: Interdisciplinary Course 182; also C-L: Canadian Studies, Comparative Area Studies, Film and Video, and Political Science 180. One course. *Smith*

184S. Canadian Issues. (SS) Prerequisite: Interdisciplinary Course 98 or consent of instructor. See C-L: Interdisciplinary Course 184S; also C-L: Canadian Studies, Comparative Area Studies, Cultural Anthropology 184S, Economics 184S, History 184S, and Political Science 184S. One course. *Staff*

190. Markets and Management. (SS) Capstone course for students in the Markets and Management Studies Certificate Program and open only to them. Includes review of major perspectives and concepts from the program's core courses, and production of a major case study research project. One course. *DiPrete, Gereffi, Janoski, O'Rand, Simpson, or Spenner*

193, 194. Independent Study. Consent of instructor required. One course each. *Staff*

195S, 196S, 197S. Seminar in Special Topics. One course each. *Staff*

For Seniors and Graduates

206. Sociological Theory. (SS) Structure, foundations, and historical antecedents of recent formulations of such theoretical approaches as phenomenological sociology, exchange theory, critical theory, structuralism, neo-Marxist sociology, sociobiology, and action theory. One course. *Tiryakian or Wilson*

207. Social Statistics I: Basic Concepts and Methods. (QR) Review of descriptive statistics; probability concepts; statistical inference, t-tests, and the analysis of variance. Bivariate correlation and regression, dummy variables, multiple regression, and the analysis of covariance. Stress on applications. Statistical computing using SPSS and other programs. One course. *DiPrete or Land*

208. Survey Research Methods. (SS) Theory and application of survey research techniques in the social sciences. Sampling, measurement, questionnaire construction and distribution, pretesting and posttesting, response effects, validity and reliability, scaling of data, data reduction and analysis. Prerequisite: Sociology 207 or the equivalent. One course. *Lin or Smith*

211S, A-E. Proseminars in Sociological Theory. (SS) Development of sociological thought; systematic sociological theory; interrelations with other social and behavioral sciences.

- A. Background of Sociology
 - B. Formal Aspects of Theory
 - C. Sociology of Knowledge
 - D. Evolutionary Theory and Sociobiology
 - E. Special Topics in Sociological Theory
- One course. *Tiryakian or Wilson*

212. Social Statistics II: Linear Models, Path Analysis, and Structural Equation Systems. (QR) Model specification, review of simple regression, the Gauss-Markov theorem, multiple regression in matrix form, ordinary and generalized least squares, residual and influence analysis. Path analysis, recursive and nonrecursive structural equation models; measurement errors and unobserved variables. Application of statistical computing packages. Prerequisite: Sociology 207 or equivalent. One course. *DiPrete or Land*

213. Social Statistics III: Discrete Multivariate Models. (QR) Assumptions, estimation, testing, and parameter interpretation for the log-linear, logit, logistic, and probit models. Model comparisons; applications of statistical computing packages and programs. Prerequisite: Sociology 212 or equivalent. One course. *DiPrete or Land*

214. Comparative and Historical Methods. (SS) Introduction to the theory of comparative research and analysis in the social sciences with special emphasis on comparative methods, quasi-experimental designs, and case studies. C-L: Comparative Area Studies and Political Science 217. One course. *Gereffi, Janoski, Lin, Smith, or Tiryakian*

215. Basic Demographic Methods and Materials. (SS) Population composition, change, and distribution. Methods of standardizing and decomposing rates, life tables and population models, analysis of data from advanced and developing countries. Applications of computer programs for demographic analysis. Prerequisite: Sociology 207 or equivalent. One course. *Myers or Parnell*

217S, A-F. Proseminars in Social Statistics and Research Methods. (SS) Selected topics in the collection and analysis of social science data.

- A. Discrete and Continuous Models of Measurement
 - B. Hazards Models, Event History Analysis, and Panel Data
 - C. Dynamic Models and Time Series Analysis
 - D. Research Design
 - E. Evaluation Research Methods
 - F. Special Topics in Social Statistics and Research Methods
- One course. *DiPrete or Land*

221S, A-D. Proseminars in Aging and Life Course Analysis. (SS) Selected topics in socialization, human development, status attainment and careers, and the sociology of aging.

- A. Social Structure and the Life Course
 - B. Social Patterns of Personal Development
 - C. Social Gerontology
 - D. Special Topics in Aging and Life Course Analysis
- One course. *Jackson, Maddox, Myers, O'Rand, or Spenner*

222S, A-G. Proseminars in Comparative and Historical Sociology. (SS) Selected topics in the differentiation and transformation of societies.

- A. Theories of Social Change
 - B. Globalization and Comparative Development
 - C. Societal Transformations and Social Institutions
 - D. Culture, Values, and Ideas
 - E. Social Movements and Political Sociology
 - F. Comparative Social Policies
 - G. Special Topics in Comparative and Historical Sociology
- One course. *Gao, Gereffi, Janoski, Lin, Simpson, Smith, or Tiryakian*

223S, A-E. Proseminars in Crime, Law, and Deviance. (SS) Selected topics in crime and the institutions of social control.

- A. Theories of Crime Causation

- B. Human Development and Criminal Careers
 - C. Social Control and the Criminal Justice System
 - D. Sociology of Law
 - E. Special Topics in Crime, Law, and Deviance
- One course. *Land, Simpson, or Wilson*

224S, A-F. Proseminars in Population Studies. (SS) Selected topics.

- A. Population Dynamics
- B. Mortality, Morbidity, and Epidemiology
- C. Urbanization and Migration
- D. Demography of the Labor Force
- E. Demography of Aging
- F. Special Topics in Population Studies

One course. *DiPrete, Land, Maddox, Manton, Myers, O'Rand, Parnell, or Smith*

225S, A-H. Proseminars in Organizations, Markets, and Work. (SS) Selected topics in complex organizations, the labor process, and changing occupations.

- A. Basic Concepts, Theories, and Methods
- B. Organizations and Environments
- C. Social Psychology of Organizations
- D. Markets and Market Systems
- E. Careers and Labor Markets
- F. Sociology of Work and Industrial Relations
- G. Special Topics I: Micro Issues
- H. Special Topics II: Macro Issues

One course. *DiPrete, Gao, Janoski, O'Rand, Spenner, or Thornton*

226S, A-G. Proseminars in Social Institutions and Processes. (SS) Selected topics in the sociology of institutions and social and institutional behavior.

- A. Social Psychology
- B. Social Stratification
- C. Political Sociology
- D. Sociology of Religion
- E. Sociology of Science
- F. Sociology of Education
- G. Special Topics in Social Institutions and Processes

One course. *Staff*

227S, A-D. Proseminars in Medical Sociology. (SS) Selected topics in medical sociology.

- A. Social Structure and Health
- B. Social Behavior and Health
- C. Organization and Financing of Health Care
- D. Special Topics in Medical Sociology (for example, social epidemiology, stress and coping, health and aging)

One course. *George, Gold, Jackson, Lin, Maddox, Thornton, or Weinberger*

228S, A-F. Proseminars in Stratification, Mobility, and Labor Force Behavior. (SS) Core and special topics in social stratification, including explanations for the existence, amount, and various dimensions of stratification in society; institutions that produce stratification; forces that cause the structure of stratification to vary both over time and across societies; and structures that govern social mobility within and across generations.

- A. Intergenerational Mobility
- B. Social Structure and the Life Course
- C. Social Inequality and the Structure of Poverty
- D. Careers and Labor Markets

E. Societal Transformation

F. Special Topics in Stratification and Mobility Research

One course. *DiPrete, Lin, Spenner, or O'Rand*

234S. Political Economy of Development: Theories of Change in the Third World. (SS) See C-L: Political Science 234S; also C-L: Comparative Area Studies, Cultural Anthropology 234S, History 234S, and Interdisciplinary Course 234S. One course. *Staff*

255. Political Sociology. (SS) Pluralist, elite, and class theories of the relationship between state and society. Topics include: recent debates on the welfare state, social control, political participation, and state-society relations in socialist economies. C-L: Canadian Studies and Political Science 255. One course. *Smith or Tiryakian*

282S. Canada. (SS) See C-L: History 282S; also C-L: Canadian Studies, Comparative Area Studies, Cultural Anthropology 282S, Economics 282S, Interdisciplinary Course 282S, and Political Science 282S. One course. *Staff*

298S, 299S. Seminar in Selected Topics. Substantive, theoretical, or methodological topics. One course each. *Staff*

COURSES CURRENTLY UNSCHEDULED

140. Environment and Society. (SS)

173. Social Conflict and Social Movements. (SS)

188. The Sociology of Contemporary Spain. (SS)

216. Advanced Methods of Demographic Analysis. (SS)

THE MAJOR

Prerequisite. Sociology 10D or, under exceptional circumstances, an equivalent course (Sociology 11, 49S) with the consent of the director of undergraduate studies.

Major Requirements. Eight courses which must include 132, 133, and 138. Only one independent study credit can be applied to the major; it may not substitute for a required course. A student may complete a second major in sociology. Requirements and advising are the same for the second major as for the first major.

A Handbook for Sociology Majors, available in the office of the director of undergraduate studies, describes areas of concentration, the honors program, and the Sociology Union. It also describes the departmental advising system and the interests of the faculty.

Institute of Statistics and Decision Sciences (STA)

Professor West, *Director*; Associate Professor Burdick, *Director of Undergraduate Studies*; Professors Berry, Sacks, and Winkler; Associate Professors Johnson, Reckhow, and Wolpert; Assistant Professors Clyde, Lavine, Müller, Parmigiani, Stangl, and Vidakovic; Adjunct Professors Peterson and Smith; Adjunct Assistant Professor Ulmer; Visiting Assistant Professors MacEachern and Mukhopadhyay

The Institute of Statistics and Decision Sciences coordinates teaching and research in statistics and decision theory at Duke. It offers various courses in basic statistics and advanced mathematical statistics. The research emphasis on statistical decision theory in the institute leads to its offering a variety of courses, at various levels, in statistics and decision sciences. There is no undergraduate major in statistics. The institute maintains and runs a Statistical Consulting Center which provides help on statistical problems and projects for members of the Duke community.

10D. Basic Statistics. (QR) Statistical concepts involved in making inferences, decisions, and predictions from data. Emphasis on applications, not formal technique. Not open to students who have had Political Science 138, Psychology 117, Public Policy Studies 112, Sociology 133, or Statistics 110, 112, 113, 114, or 115. One course. *Staff*

104. Probability. (QR) Prerequisite: Mathematics 103. See C-L: Mathematics 135. One course. *Staff*

104S. Probability. (QR) Prerequisite: Mathematics 103. See C-L: Mathematics 135S. One course. *Staff*

110A. Statistics and Data Analysis in the Social Sciences. (QR) Descriptive statistics. Probability and its role in statistical inference. Confidence intervals. Tests of significance. Introduction to linear regression modeling. Not open to students who have had Mathematics 136 or Statistics 110B, 112, 113, 114, 210A, 210B, or 213. One course. *Staff*

110B. Statistics and Data Analysis in Economics. (QR) Descriptive statistics. Probability and its role in statistical inference. Confidence intervals. Tests of significance. Introduction to linear regression modeling. Emphasis on applications in economics. Not open to students who have had Mathematics 136, Statistics 110A, 112, 113, 114, 210A, 210B, or 213. One course. *Staff*

112. Introduction to Applied Statistics. (QR) Classical techniques of testing and estimation. Emphasis on applications of the theory to applied problems. Not open to students who have taken Statistics 213 or equivalent. Prerequisite: Mathematics 103 (may be taken concurrently) or equivalent, or consent of instructor. One course. *Staff*

113. Probability and Statistics in Engineering. (QR) Introduction to probability, independence, conditional independence, and Bayes' theorem. Discrete and continuous, univariate and multivariate distributions. Linear and nonlinear transformations of random variables. Classical and Bayesian inference, decision theory, and comparison of hypotheses. Experimental design, statistical quality control, and other applications in engineering. Not open to students who have taken Statistics 112 or 213. Prerequisite: Mathematics 103 or equivalent. One course. *Staff*

114. Statistics. (QR) Prerequisites: Mathematics 104 and 135. See C-L: Mathematics 136. One course. *Staff*

191, 192. Independent Study. Directed reading and research. Consent of instructor and director of undergraduate studies required. One course each. *Staff*

205. Probability and Measure Theory. (QR) Introduction to probability spaces, the theory of measure and integration, random variables, and limit theorems. Distribution functions, densities, and characteristic functions; convergence of random variables and of their distributions; uniform integrability and the Lebesgue convergence theorems. Weak and strong laws of large numbers, central limit theorem. Prerequisites: elementary real analysis and elementary probability theory. One course. *Wolpert*

207. Probability. (QR) Prerequisite: Mathematics 281 or equivalent. See C-L: Mathematics 290. One course. *Staff*

210A. Statistics and Data Analysis for Policymakers. (QR) Elements of statistical inference and estimation including exploratory data analysis, regression, and analysis of variance. Emphasis on public policy applications. Not open to students who have had Mathematics 136 or Statistics 110A, 110B, 112, 113, 114, 210B, or 213. C-L: Public Policy Studies 222. One course. *Staff*

210B. Statistics and Data Analysis in Biological Science. (QR) Elements of statistical inference and estimation including exploratory data analysis, regression, and

analysis of variance. Emphasis on biological science applications. Not open to students who have had Mathematics 136 or Statistics 110A, 110B, 112, 113, 114, 210A, or 213. C-L: Environment 251. One course. *Staff*

213. Introduction to Statistical Methods. (QR) Emphasis on classical techniques of hypothesis testing and point and interval estimation, using the binomial, normal, t, F, and chi square distributions. Not open to students who have had Statistics 114 or Mathematics 136. Prerequisite: Mathematics 103 (may be taken concurrently) or equivalent, or consent of instructor. One course. *Staff*

214. Probability and Statistical Models. (QR) An introduction to applied probability and to the parametric probability models commonly used in statistical analysis. The generation of random variables with specified distributions, and their use in simulation. Mixture models; linear regression models; random walks, Markov chains, and stationary and ARMA process; networks and queueing models. Prerequisites: Mathematics 103 and 104 or consent of instructor. One course. *Staff*

215. Statistical Inference. (QR) Classical, likelihood, and Bayesian approaches to statistical inference. Foundations of point and interval estimation, and properties of estimators (bias, consistency, efficiency, sufficiency, robustness). Testing: Type I and II errors, power, likelihood ratios; Bayes factors, posterior probabilities of hypotheses. The predictivist perspective. Applications include estimation and testing in normal models, exponential families, regression and one-way ANOVA, contingency tables. Hierarchical normal models; model choice and criticism. Prerequisite: Statistics 213 or co-registration in Statistics 214 or consent of instructor. One course. *Staff*

216. Generalized Linear Models. (QR) Likelihood-based inference in generalized linear models (GLIMs). Multiple linear regression, theory, and practice. Elements of Bayesian analyses of linear models. Theory of likelihood-based inference for GLIMs. Factor variables and cross-classified data arrays. Discrete models: binary regressions and simple contingency tables. Introduction to log-linear models. Data analysis: model fitting, model choice, and residuals-based diagnostics. Prerequisites: Statistics 214 and co-registration in Statistics 215 or equivalent. One course. *Staff*

226. Statistical Decision Theory. (QR) Formulation of decision problems; criteria for optimality: maximum expected utility and minimax. Axiomatic foundations of expected utility; coherence and the axioms of probability (the Dutch Book theorem). Elicitation of probabilities and utilities. The value of information. Estimation and hypothesis testing as decision problems: risk, sufficiency, completeness and admissibility. Stein estimation. Bayes decision functions and their properties. Minimax analysis and improper priors. Decision theoretic Bayesian experimental design. Combining evidence and group decisions. Prerequisite: Statistics 215 or consent of instructor. One course. *Staff*

242. Applied Regression Analysis. (QR) Linear regression using both graphical and numerical methods. Model construction, critique, and correction using graphical residual analysis. One-way and two-way analysis of variance; introduction to design of experiments. Use of a standard statistical software package. Applications and examples drawn from various sources, emphasizing the biological and environmental sciences. Prerequisite: Statistics 210B or equivalent. One course. *Staff*

244. Linear Models. (QR) Multiple linear regression. Estimation and prediction. Likelihood, Bayesian, and geometric methods. Analysis of variance and covariance. Residual analysis and diagnostics. Model building, selection, and validation. Prerequisites: Mathematics 104 and Statistics 113 or 210. C-L: Mathematics 241. One course. *Staff*

245. Introduction to Multivariate Statistics. (QR) Multinormal distributions, multivariate general linear model, Hotelling's T^2 statistic, Roy union-intersection principle,

principal components, canonical analysis, factor analysis. Prerequisite: Statistics 244 or equivalent. C-L: Mathematics 242. One course. *Burdick*

253. Applied Stochastic Processes. (QR) Prerequisite: Mathematics 135 or equivalent. See C-L: Mathematics 240. One course. *Staff*

273. Numerical Analysis. (QR) Prerequisites: knowledge of an algorithmic programming language, intermediate calculus including some differential equations, and Mathematics 104. See C-L: Computer Science 250; also C-L: Mathematics 221. One course. *Gardner, Greenside, or Rose*

282. Optimization Methods. (QR) Optimization techniques useful in decision making. Numerical techniques for nonlinear optimization, with and without constraints; linear and quadratic programming; applications. Other topics, including dynamic programming, optimal control, and stochastic methods, as time permits. Prerequisites: Mathematics 32 and 104 or equivalent, or consent of instructor; knowledge of a computer programming language is helpful but not required. One course. *Wolpert*

290. Case Studies in Applied Statistics. (QR) Data management and collection, sampling and design, exploratory data analysis, graphical and tabular displays, summarizing data. Case studies from various disciplines such as biostatistics, economics, medical decision making, engineering, and business administration presented by various faculty members. Introduction to applied work through workshops, consultancy, and research literature. Computer orientation, statistical packages and operating systems, graphics, and numerical computing. May be taken more than once. One course. *Staff*

293. Special Topics in Statistics. (QR) Advanced topics in analysis of variance, design of experiments, nonparametric statistics, foundations of statistical inference. Prerequisite: Statistics 213 or consent of instructor. One course. *Staff*

297. Topics in Probability Theory. Prerequisite: Mathematics 290 or consent of instructor. See C-L: Mathematics 293. One course. *Staff*

COURSES CURRENTLY UNSCHEDULED

30. Introduction to Decision Analysis. (QR)

31. Applied Game Theory. (QR)

115. Statistical Data Analysis in Engineering. (QR)

203S. Senior Seminar in Statistics. (QR)

246. Experimental Design. (QR)

294. Special Topics in Statistics. (QR)

298. Topics in Probability Theory

Swahili

For courses in Swahili, see Asian and African Languages and Literature.

University Writing Program (UWC)

Professor of the Practice Gopen, *Director*; Assistant Professor of the Practice Hillard, *Assistant Director*; Assistant Professor of the Practice Brett

The writing requirement may be fulfilled by successfully completing University Writing Course 4, 5, 6, 7, or 8, each of which involves expository themes and regular individual conferences. The requirement must be fulfilled in a student's first semester

of residence at Duke. Despite the distinction in titles and topics, all these courses deal with the same core concerns and have the same objective: they are intended to help students of all abilities to a greater understanding of the language and thereby to a greater control of their thinking process.

4. Principles of Writing. Designed for those who feel less confident than they would like about their writing. Principles of clear, sophisticated, college-level prose. Essays on a variety of topics. One course. *Staff*

5. Persuasive Writing. Differs from University Writing Course 4 in only three ways: (1) the essays in each course section are based on a single topic, the readings for which are primarily nonfiction; (2) the class size is slightly larger; and (3) the pace may be somewhat faster. One course. *Staff*

7. Writing on Special Topics. Themes and readings vary with the topic of each section. Enrollment by invitation only to students in specified programs. One course. *Staff*

8. Expository and Persuasive Writing. This course, which covers the rhetorical principles available in University Writing Course 4, 5, 6, and 7, is offered only in the spring. The readings vary with the individual instructors. Not open to students who have passed 4, 5, 6, or 7. One course. *Staff*

12. Intermediate Composition. For transfer students and continuing education students only. The approach to evaluating written language that is taught in the University Writing Program. Not open to students who have taken University Writing Course 4, 5, 6, 7, or 8. One course. *Staff*

112. Scientific Writing. Advanced composition for those who will be choosing careers in science. Techniques for presenting complicated data and complex thought in clear and persuasive prose. Readings in the history, philosophy, or theory of science. Weekly writing tasks. Prerequisite: University Writing Course 4, 5, 6, or 7. C-L: English 116A. One course. *Staff*

117S. Advanced Composition I. Emphasis on the connections between substance and structure; revision techniques and inventional procedures. Tailored to the level, needs, and interests of students who enroll. Prerequisite: previous University Writing Course or consent of the director of the University Writing Program. C-L: English 117A. One course. *Staff*

118S. Advanced Composition II. Emphasis on preparing prose for publication, in whatever fields interest the participating students. Prerequisite: successful completion of University Writing Course 117S. C-L: English 117B. One course. *Staff*

COURSES CURRENTLY UNSCHEDULED

3. Introductory Composition and Rhetoric

6. Interpretive Writing

For other courses in writing, see listings for Department of English.

Women's Studies Program (WST)

Professor of the Practice and Adjunct Professor J. O'Barr, *Director*; Professor Hamilton; Visiting Associate Professor De Lamotte; Visiting Assistant Professor Frankel

A major or a certificate is available in this program.

The program in women's studies provides for students an understanding of the forces that shape the position of women and men in society and develops an apprecia-

tion for knowledge about gender. Women's studies brings together faculty and students from across the university who are encouraged to question and reinterpret existing bodies of knowledge and to include women's perspectives and contributions in this critical approach.

The courses listed below are offered by the Women's Studies Program (WST) or are cross-listed with other academic departments and programs. Both are used to fulfill the requirements for the major or certificate. For a more detailed description of each course, consult the Women's Studies Program Office or the appropriate department or program office.

REGULARLY SCHEDULED COURSES IN WOMEN'S STUDIES

Women's Studies Courses (WST)

103. An Introduction to Women's Studies. (SS) Gender roles, their place in American culture, and the twentieth-century feminist movement. Use of the perspectives of the social sciences, the natural sciences, and the humanities. Emphasis on integrating the study of women, women's history, experience, and modes of expression into the traditional disciplines. One course. *J. O'Barr and staff*

150. Selected Topics in Women's Studies. Topics vary, focusing on interdisciplinary work arising from feminist scholarship. One course. *Staff*

191, 192. Independent Study. Consent of instructor and program director required. One course each. *Staff*

195S. Senior Seminar in Women's Studies. Original research project in feminist scholarship, applying multidisciplinary perspectives. For Women's Studies Program certificate earners. Consent of instructor required. One course. *Staff*

Departmental Courses

Art 186/Literature 149. *Feminism in Twentieth-Century Art. Stiles*
Asian and African Languages and Literature 173. *Women in Arab Literature. Cooke*
Classical Studies 104S. *Women in the Ancient World. Boatwright*
Classical Studies 195S, 196S. *Sex Roles in Antiquity. Boatwright*
Cultural Anthropology 113. *The Cultural Construction of Gender. Allison, Quinn, or Starn*
Cultural Anthropology 114. *Gender Inequality. Quinn or Starn*
Cultural Anthropology 215S. *The Anthropology of Women: Theoretical Issues. Staff*
Cultural Anthropology 216S. *Gender, Race, and Class. Luttrdl*
Drama 125S. *Twentieth-Century Women Playwrights. McAuliffe*
English 109S. *Topics in Women's Poetry. Pope*
English 169S. *Twentieth-Century Popular American Women's Writing. Tompkins*
English 170. *Writings by Women of Color. Willis*
English 179S. *Studies in Women's Fiction. Pope*
English 269. *American Women Writers. C. Davidson, Pope, or Tompkins*
French 104S. *Women in Contemporary France. Orr*
French 108S. *French Women: Myths, Realities, and the Law. Staff*
French 157. *Difference and Representation. Schor*
French 159. *Feminist Fiction. Orr*
French 290S. *Studies in a Contemporary Figure. Orr*
German 124S. *Contemporary German Women Writers. Rasmussen*
German 254S. *Literature by Women. Rasmussen*
German 275S. *German Women Writers. Rasmussen*
History 169A, 169B. *The Social History of American Women. Hewitt*
History 171A. *History of Women in Early Modern Europe. Neuschel*
History 171B. *History of Women in Modern Europe. Koonz*
History 190. *The History of Women in Science and Medicine. Green*
History 195S.05. *Japanese Women's History. Wigen*
History 195S.36. *Women, Family, and the State. Y. Miller*
History 195S.41. *Women in Medieval Society. Green*
History 195S.50. *History of Feminism in the U.S. Hewitt*
History 195S.66. *Sex, Class, and Race in America. Hewitt*
Italian 105. *Italian Women Writers. Finucci*

Literature 136. *Autobiography across Cultures. Kaplan or Willis*
 Literature 151. *Special Topics in Women Writers of the World. Staff*
 Literature 254. *Introduction to Feminism. Moi or Radway*
 Music 120S. *Women in Music. Staff*
 Philosophy 122. *Philosophical Issues in Feminism. Lind*
 Philosophy 203S. *Contemporary Ethical Theories. Lind*
 Political Science 140. *Feminist Political Theory. Curtis*
 Political Science 163. *Gender, Politics, and Policy: The Third World Case. J. O'Barr*
 Political Science 200S,A.18. *Contemporary American Feminism. J. O'Barr*
 Psychology 164S. *Psychology of Women. Hamilton or Roth*
 Psychology 264S. *Gender, Hormones, and Health. Hamilton*
 Religion 109. *Women in the Biblical Tradition: Image and Role. C. Meyers*
 Religion 125. *Women and Sexuality in the Christian Tradition. Clark*
 Religion 253. *Feminist Theory and the Study of Christianity. Clark and McClintock-Fulkerson*
 Russian 169/269. *Women and Russian Literature. Gheith*
 Sociology 118. *Sex, Gender, and Society. O'Rand*
 Sociology 149. *Sexuality and Society. Luttrell*
 Spanish 141S. *Spanish-American Women Writers. Ross*

Recommended Course Offerings

The courses below are taught by affiliated faculty and are recommended by the Women's Studies Program as complementary and relevant. With a program advisor's permission, up to two of these courses may be used to fulfill requirements for the major and one course may be used to fulfill the requirements for the certificate.

Art 167. *Twentieth-Century Art, 1900-1945. Stiles*
 Art 168. *Art since 1945: Modernism and Postmodernism. Stiles*
 Art 179. *History of Event Art. Stiles*
 Art 187. *Surrealism. Stiles*
 Cultural Anthropology 110. *Advertising and Society. Luttrell or W. O'Barr*
 Economics 208S. *Economics of the Family. McElroy*
 English 1139S. *Politics of Gender. DeNeef*
 English 154. *American Literature: 1915-1960. Pope*
 English 156. *American Popular Culture. Radway or Willis*
 English 163. *Twentieth-Century American Poetry. Pope*
 English 179S. *Repairing the Continent. A. Davidson*
 English 187. *Melodrama and Soap Opera. Gaines*
 English 189S. *Sexualities in Film and Literature. Gaines*
 English 288. *The Western in American Culture. Tompkins*
 French 166, 167. *Contemporary French Life and Thought. Kaplan*
 History 107A, 107B. *Social and Cultural History of England. Herrup or Thorne*
 History 11S. *History of Africa. Ewald*
 History 117. *Early Modern Europe. Neuschel*
 History 160. *The United States from the New Deal to the Present. Chafe*
 History 227-228. *Recent United States History: Major Political and Social Movements. Chafe*
 Literature 177. *Film Theory. Gaines*
 Literature 185. *Psychoanalysis, Literature, and Film. Gaines*
 Political Science 187S. *Politics and the Libido. Paletz*
 Psychology 208S. *Emotion. Fredrickson*
 Religion 40. *Judaism. Bland and staff*
 Religion 234. *Early Christian Asceticism. Clark*
 Sociology 106. *Social Psychology. Fischer or George*
 Sociology 111. *Inequality in America. Kerckhoff or O'Rand*
 Sociology 150. *The Changing American Family. Kerckhoff or Simpson*
 Sociology 161. *Adulthood and Aging. George, Gold, or O'Rand*
 Sociology 163. *Aging and Health. George or Gold*
 Sociology 16S. *Occupations, Professions, and Careers. Simpson or Spenner*
 Spanish 166. *Nineteenth-Century Prose Fiction. Sieburth*

House Courses. The Women's Studies Program regularly sponsors house courses on topics of interest to students in the program. While house courses do not officially count toward the major or the certificate, students are strongly encouraged to consider them as valuable supplements to full-credit courses. Lists of the house courses being offered are available in the program office at the beginning of each semester.

THE MAJOR

To major in women's studies, a student must take a minimum of eight courses. Introduction to Women's Studies (WST 103) and a senior seminar (WST 195S) or their equivalents are required for the major. At least six of these courses must come from courses listed in women's studies either designated as WST or cross-listed with other departments. Up to two courses may be in the following forms: (1) independent studies, (2) courses from the Recommended Course Offerings list, or (3) one-time course offerings not appearing on regular lists, but which are complementary and relevant to a student's course of study. Such courses must be approved by a program advisor in order to be credited toward the major.

As an interdisciplinary major, the women's studies major is organized around a set of guidelines rather than a sequence of required courses. The guidelines are designed to facilitate three distinct yet overlapping levels of inquiry into women's experiences and gender analysis: *comparison, critique, and connection*. Within the requirements for the major, a student has a great deal of flexibility in designing the substantive focus of the major. To fulfill the major, students must take at least two courses that are primarily comparative in nature, two that focus on critique, and two that emphasize connection. Additional courses may fall under any of these guidelines.

Comparative perspectives are pursued in at least two ways: within and across disciplines and within and across cultures. By comparing how feminist analysis operates in two or more disciplines, students will be able to identify and analyze the ways in which the methods of academic inquiry differ by discipline and what makes an analysis feminist. By comparing cultural contexts, students will be able to identify and analyze women's and men's diverse experiences.

Acquiring critical perspectives is a process involving three steps. The first is to produce new knowledge. In the light of that new knowledge, the second step is to modify the frameworks of knowledge that already exist. The third step is to correct assumptions and biases that prove to be incorrect in the light of this more complete knowledge. Critical perspectives are honed in the women's studies major through courses which emphasize the historical omissions, factual errors, and misrepresentations of women's experiences.

The emphasis on *connections* is one of the distinguishing features of the women's studies major. Students are continually encouraged to make connections between ideas and experiences, between past knowledge and future possibilities, between cultural and policy issues and personal decisions, and between women's studies and other academic study. These connections are fostered in senior seminars and independent studies, and through internships or other supervised practice.

Individual courses will often fulfill more than one of these guidelines. Students will be expected to articulate the ways in which an individual course and particular configurations of courses have facilitated their pursuit of comparison, critique, and connection. Students are thus responsible for designing their own major in close consultation with program advisors. This allows students to explore the topics which most interest them; the flexible nature of the curricular requirements also enables students to take advantage of the one-time course offerings and visiting scholars in constructing personalized programs.

In planning the major, each student works with a faculty advisor to accomplish three goals. The first is to develop a coherent plan of study through which the student pursues a theme or concentration within coursework; that theme or concentration may emphasize breadth or depth in subject matter. The second is to insure that a student balances introductory and advanced courses as they are available from other departments. The third is to fulfill the three guidelines of comparison, critique, and connection described above.

Students may complete a first or second major in women's studies, or they may choose to pursue their interests in women's studies in the form of a certificate.

THE CERTIFICATE

The requirements for the certificate reflect the ideas shaping the major. A student must complete five courses, including Women's Studies 103, Introduction to Women's Studies, or its equivalent. At least four of these courses must come from courses listed in women's studies. At least one course must be a 100-level seminar. Following the same three guidelines of comparison, critique, and connection, students must take at least one course that is comparative in nature, one course that focuses on critique, and one course that emphasizes connections.

ADVISING

Each year, several faculty affiliated with the women's studies program serve as advisors for students majoring in women's studies. Majors are paired with faculty advisors on the basis of students' general areas of interest. Students majoring in women's studies are encouraged to seek out and work with any of the women's studies faculty in addition to their primary faculty advisor.

HONORS/DISTINCTION

Qualified students earning an undergraduate certificate or major may be eligible for graduation with distinction in women's studies. Students majoring in women's studies are also eligible for Latin honors by project in Trinity College. (See the section on Academic Recognition and Honors in this bulletin.) More detailed guidelines are available in the program office. Studies interested in being considered for honors/distinction should contact the program office no later than the spring of their junior year.

In addition to offering courses, and a major and certificate representing a focus in women's studies, the program sponsors lectures, films, discussions, conferences, internships, and work-study opportunities. Additional information on courses, the women's studies major or certificate, and other opportunities in women's studies is available at the Women's Studies Program Office, 210 East Duke Building.

Writing

See University Writing Program.

Zoology (ZOO)

Professor H. Nijhout, *Chair*; Professors Barber, Brandon, Forward, Gillham, Klopfer, Laurie, Livingstone, McClay, Nicklas, Rausher, Simons, Staddon, Terborgh, Tucker, Uyenoyama, Vogel, Wainwright, and Ward; Associate Professors Rittschof, Roth, K. Smith, and Van Schaik; Assistant Professors Crenshaw, Cunningham, Fehon, Morris, and Nowicki; Professors Emeriti Bailey, Bookhout, Costlow, Fluke, Gregg, Schmidt-Nielsen, and K. Wilbur; Assistant Professors of the Practice Mercer and Motten; Research Assistant Professor Roach; Adjunct Professor Schmidt-Koenig; Adjunct Associate Professor M. Nijhout

See Biology for a description of the major and the list of courses taught by the zoology faculty.

School of Engineering

Professor Dowell, *Dean*; Professor Shepard, *Associate Dean*

ENGINEERING

(INTERDEPARTMENTAL) (EGR)

24L. **Introduction to Environmental Engineering.** Materials and energy balances applied to environmental engineering problems. Water pollution control, applied ecol-

ogy, air quality management, solid and hazardous waste control. Environmental ethics. (1.0 ES) Prerequisite: Chemistry 11L. One course. *Vesilind*

25L. Structural Engineering Design. An introduction to engineering and the engineering method through a wide variety of historical and modern case studies, ranging from unique structures like bridges to mass produced objects like pencils. (.5 ED/ .5 ES) One course. *Petroski*

49S. First-Year Seminar. Topics vary each semester offered. One course. *Staff*

50. Introduction to Numerical Computing. Introduction to the use of computers in the solution of engineering and scientific problems. Systematic methods for algorithm development and coding in a higher-level computer language. Application of selected numerical methods. Not open to students who have matriculated at Duke. One course. *Pas*

53L. Computational Methods in Engineering. Introduction to computer methods and algorithms for analysis and solution of engineering problems using numerical methods in a workstation environment. Topics include; numerical integration, roots of equations, simultaneous equation solving, finite difference methods, matrix analysis, linear programming, dynamic programming, and heuristic solutions used in engineering practice. This course includes instruction in the programming language FORTRAN and does not require any prior knowledge of computer programming. (1.0 ES) One course. *Staff*

75L. Mechanics of Solids. Analysis of force systems and their equilibria as applied to engineering systems. Stresses and strains in deformable bodies; mechanical behavior of materials; applications of principles to static problems of beams, torsion members, and columns. Selected laboratory work. (1.0 ES) Prerequisites: Physics 51L and Mathematics 32. One course. *Biswas, Hueckel, Petroski, or J. F. Wilson*

83L. Structure and Properties of Solids. Introduction to materials science and engineering, emphasizing the relationships between the structure of a solid and its properties. Atomic and molecular origins of electrical, mechanical, and chemical behavior are treated in some detail for metals, alloys, polymers, ceramics, glasses, and composite materials. (.25 ED/.75 ES) Prerequisites: Chemistry 11L and Mathematics 31 or 33. One course. *Cocks, Gösele, Jones, Needham, Shepard, or Tan*

115. Engineering Systems Optimization. Introduction to mathematical optimization, engineering economic analysis, and other decision analysis tools used to evaluate and design engineering systems. Application of linear and nonlinear programming, dynamic programming, expert systems, simulation and heuristic methods to engineering systems design problems. Applications discussed include: production plant scheduling, water resources planning, design and analysis, vehicle routing, resource allocation, repair and rehabilitation scheduling and economic analysis of engineering design alternatives. (.5 ED/.5 ES) Corequisite: Mathematics 111. One course. *Jacobs or Pas*

123L. Dynamics. Principles of dynamics of particles, rigid bodies, and selected nonrigid systems with emphasis on engineering applications. Kinematic and kinetic analysis of structural and machine elements in a plane and in space using graphical, computer, and analytical vector techniques. Absolute and relative motion analysis. Work-energy; impact and impulse-momentum. Laboratory experiments. (1.0 ES) Prerequisites: Mathematics 103 and Engineering 75L or consent of instructor. One course. *Petroski, Virgin, or J. F. Wilson*

150L. Engineering Communication. Principles of written and verbal technical communication; graphics, mapping, surveying and engineering drawing. Computer graphics, two- and three-dimensional transformations, hidden-surface and hidden-line algorithms, and computer aided design. (1.0 ES) Prerequisite: Engineering 53L or equivalent. One course. *Pas and Vesilind*

165. Special Topics in Engineering. Study arranged on special engineering topics in which the faculty have particular interest and competence as a result of research or professional activities. Consent of instructor(s) required. Quarter course, half course, or one course. Variable credit. *Staff*

174. Technology Assessment and Social Choice. Societal, economic, environmental, psychological, and ethical considerations in the design and application of technological systems; techniques for technological forecasting and assessment; citizen participation in policy-making; recent case studies; interdisciplinary team project. C-L: Religion 174. One course. *Garg and McCollough*

175. Aesthetics, Design, and Culture. An examination of the role of aesthetics, both as a goal and as a tool, in a culture which is increasingly dependent on technology. Visual thinking, perceptual awareness, experiential learning, conceptual modeling, and design will be explored in terms of changes in sensory environment. Design problems will be formulated and analyzed through individual and group design projects. (.5 ED) One course. *Pearsall*

183, 184. Projects in Engineering. Courses in which engineering projects of an interdisciplinary nature are undertaken. The projects must have engineering relevance in the sense of undertaking to meet human need through a disciplined approach under the guidance of a member of the engineering faculty. Consent of instructor required. One course each. *Staff*

221. Computational Linear Algebra. Linear vector spaces of real and complex n-tuples, norms, metrics, inner-products, basis vectors, rank and dimensionality; matrices as linear maps, rank and nullity; particular and general solutions of $Ax=b$; factorization of matrices by successive transformations; solution of $Ax=b$ by direct and iterative methods; special and general eigenvalue problems; diagonalization and tridiagonalization by similarity transformations; power methods; and computational complexities, storage requirements, convergence characteristics, error propagation, and the mathematical basis of the studied algorithms. (1.0 ES) Prerequisites: Mathematics 111 or equivalent, and knowledge of any algorithmic programming language. One course. *S. Utku*

COURSES CURRENTLY UNSCHEDULED

23. Principles and Practices in Engineering Economics

135. Continuum Mechanics

151. Computer Simulations in Engineering

170. Forecasting Techniques

172A. Contemporary Science: Issues and Challenges

172B. Contemporary Technology: Issues and Challenges

187. History of Nuclear Energy: Civilian Applications

188. History of Nuclear Energy: Military Applications

222. Computer Solutions of Ordinary and Partial Differential Equations

Biomedical Engineering (BME)

Professor McElhaney, *Chair*; Professor S. Smith, *Director of Undergraduate Studies*; Professors Barr, Clark, Hammond, Hochmuth, Ideker, Jaszczak, Katz, Lieberman, Nolte, Plonsey, von Ramm, and Wolbarsht; Associate Professors Burdick, Feagin, Floyd, Massoud, Needham, Reichert, W. Smith, and Trahey; Assistant Professors Clegg, Glower, Henriquez, Krassowska, Myers, P. Smith, Truskey, Von Trigt, and Wolf; Research Professor Thurstone; Associate Research Professor Pasipoularides; Assistant Research Professors Bohs, Cusma, Hales, Jacobs, Knisley, Nightingale, Rasmusson, M. Smith, Stetten, and Trayanova; Adjunct Associate Professor Cooper

A major is available in this department.

Biomedical engineering is the discipline in which the physical, mathematical, and engineering sciences and associated technology are applied to biology and medicine. Contributions range from modeling and simulation of physiological systems through development of medical instrumentation and experimental research to solutions of practical clinical problems. The undergraduate program in biomedical engineering is flexible and can satisfy the requirements for entrance into graduate work in engineering, medicine, and other professional schools or science disciplines.

Opportunities for student research are available in the biomedical engineering laboratories. The department utilizes digital computers extensively, and computer science techniques are applied in acquiring, processing, and modeling biological data. Research in the biomedical materials laboratory is directed toward the development of materials suitable for use in biological environments such as the vascular system. Biomedical engineering in cardiology involves study of the electrical activity of the heart and heart tissues in animals and humans, to increase the basic knowledge of their normal and abnormal behavior. Other electrophysiological systems are examined through the application of models and simulation techniques. The ultrasound imaging laboratories are employed for research and instruction in the biomedical application of this important technique. Ultrasound instrumentation measures and images biological tissue structures, and the laboratories are equipped with a variety of advanced ultrasonic imaging instruments. A transducer fabrication facility, test equipment for the design and construction of advanced ultrasound systems, a dedicated VAX 4300 computer and a DECstation 3100 for image processing, and extensive video recording and display facilities are available. Other areas of research and instruction include biosensors and vascular implants. The biomechanics laboratory is equipped to measure biomechanical responses of tissues and organs and gait parameters, and to test protective headgear and develop new prosthetic devices.

Additional opportunities are available in biological fluid mechanics, lipid transport mechanisms, and biosensors.

7. Membranes. An introduction to the elementary properties of membranes, both electrical and mechanical from a mathematical perspective, with some computer exercises. Intended for freshmen who are prospective biomedical engineering majors. (.5 ED / .5 ES) One course. *Barr or Plonsey*

83L. Introduction to Biomaterials. The principles of materials science and engineering with particular attention to topics most relevant to biomedical engineering. The structure-property relationships of metals, ceramics, polymers, and composites as well as skin, bone, cartilage, ligament, and vasculature; extensive treatment of the properties unique to materials' surfaces. Behavior of materials in the physiological environment. Fall only. (.25 ED / .75 ES) Prerequisites: Chemistry 11L and 12L; corequisite: Physics 51L. One course. *Reichert*

101L. Electrobiolology. The electrophysiology of excitable cells from a quantitative perspective. Topics include the ionic basis of action potentials, the Hodgkin-Huxley model, impulse propagation, source-field relationships, and an introduction to functional electrical stimulation. (.25 ED / .75 ES) Prerequisites: Biomedical Engineering 163 or Electrical Engineering 62, and Mathematics 111. One course. *Barr, Henriquez, Krassowska, or Trayanova*

106. Mass and Energy Balances in Chemical and Biological Systems. Engineering problems involving material and energy balances taken from chemical and biochemical process industries and mammalian physiology. Batch and continuous reactive systems in the steady and unsteady state. Humidification processes. Metabolism. (.5 ED / .5 ES) Not open to students who have taken Biomedical Engineering 145 or Mechanical Engineering 101L. Prerequisite: Chemistry 12L. One course. *Clark*

110L. Introductory Biomechanics. Static and dynamic analysis of biological systems; analysis of gait and locomotion; ballistocardiography; biomechanical aspects of various sport activities, diving, and jumping; power, work, and energy concepts applied to the human body; strength and properties of tissue; and injury mechanisms and tolerance. (.25 ED / .75 ES) Prerequisites: Mathematics 32 and Physics 51L. One course. *McElhaney, Myers, or Nightingale*

145. Chemical Thermodynamics. Thermodynamic properties and thermodynamic state. Exchange of heat and work in quasi-equilibrium processes. Chemical and phase equilibria of multicomponent mixtures. (.25 ED / .75 ES) Prerequisite: junior standing. One course. *Clark or Truskey*

163L, 164L. Biomedical Electronics and Measurements. A study of the basic principles of biomedical electronics and measurements with emphasis on the operational performance and selection of transducers, instruments, and systems for biomedical data acquisition and processing. Selected laboratory work emphasizes the measurements of specific physiological events. (.5 ED / .5 ES each) Prerequisite: Electrical Engineering 61L. One course each. *S. Smith, Trahey, or von Ramm*

171. Signals and Systems. Convolution, deconvolution, Fourier series, Fourier transform, sampling, and the Laplace transform. Continuous and discrete formulations with emphasis on computational and simulation aspects and selected biomedical examples. (1.0 ES) One course. *Staff*

191, 192. Projects in Biomedical Engineering. For juniors or seniors who express a desire for such work and who have shown aptitude for research in one area of biomedical engineering. Half course to two courses. (.5 ED / .5 ES) Variable credit. *Staff*

193, 194, 195. Projects in Cardiovascular Biomedical Engineering. Projects in emerging cardiovascular technologies. Primarily for engineering research center fellows who express a desire for and who have shown aptitude for research in emerging cardiovascular technologies. Consent of instructor required. (.5 ED / .5 ES) One course each. *Staff*

201L. Electrophysiology. The electrophysiology of excitable cells from a quantitative perspective. Topics include the ionic basis of action potentials, the Hodgkin-Huxley model, impulse propagation, source-field relationships, and an introduction to functional electrical stimulation. Students choose a relevant topic area for detailed study and report. Not open to students who have taken Biomedical Engineering 101 or equivalent. 3 units; 4 units with laboratory. (.25 ED / .75 ES) One course. *Barr or Henriquez*

205L. Microprocessors and Digital Instruments. Design of microcomputer-based devices including both hardware and software considerations of system design. Primary emphasis on hardware aspects, including a progression through initial design, proto-

type construction in the laboratory, testing of prototypes to locate and correct faults, and final design evaluation. Evaluation includes examination of complexity, reliability, and cost. Design and construction oriented toward biomedical devices or instruments that include dedicated microcomputers, usually operating in real time. (.75 ED/.25 ES) Prerequisites: Engineering 51L and Biomedical Engineering 163L, 164L or equivalents. One course. *Barr or Hammond*

207. Transport Phenomena in Biological Systems. An introduction to the modeling of complex biological systems using principles of transport phenomena and biochemical kinetics. Topics include the conservation of mass and momentum using differential and integral balances; rheology of Newtonian and non-Newtonian fluids; steady and transient diffusion in reacting systems; dimensional analysis; homogeneous versus heterogeneous reaction systems. Biomedical and biotechnological applications are discussed. (.25 ED/.75 ES) C-L: Civil Engineering 207 and Mechanical Engineering 207. One course. *Truskey*

208. Theoretical and Applied Polymer Science. (.6 ED/.4 ES) See C-L: Mechanical Engineering 211. One course. *H. Clark*

209. Kinetics and Reactor Design. Introduction to chemical and biochemical reaction stoichiometry and kinetics. Concepts of elementary reactions, reaction sequences, steady-state approximations, and rate-limiting steps. Ideal and non-ideal isothermal and non-isothermal reactor design and analysis. Homogeneous and heterogeneous reactor concepts, multiplicity, mass transfer limitations. (.5 ED/.5 ES) Prerequisite: Mathematics 111 or consent of instructor. C-L: Civil Engineering 209. One course. *Staff*

211. Theoretical Electrophysiology. Advanced topics on the electrophysiological behavior of nerve and striated muscle. Source-field models for single-fiber and fiber bundles lying in a volume conductor. Forward and inverse models for EMG and ENG. Bidomain model. Model and simulation for stimulation of single-fiber and fiber bundle. Laboratory exercises based on computer simulation, with emphasis on quantitative behavior and design. Readings from original literature. (.5 ED/.5 ES) Prerequisite: Biomedical Engineering 101 or 201 or equivalent. One course. *Barr or Plonsey*

212. Theoretical Electrocardiography. Electrophysiological behavior of cardiac muscle. Emphasis on quantitative study of cardiac tissue with respect to propagation and the evaluation of sources. Effect of junctions, inhomogeneities, anisotropy, and presence of unbounded extracellular space. Bidomain models. Study of models of arrhythmia, fibrillation, and defibrillation. Electrocardiographic models and forward simulations. Laboratory exercises based on computer simulation, with emphasis on quantitative behavior and design. Readings from original literature. (.5 ED/.5 ES) Prerequisite: Biomedical Engineering 101 or 201 or equivalent. One course. *Barr or Plonsey*

215. Biomedical Materials and Artificial Organs. Chemical structures, processing methods, evaluation procedures, and regulations for materials used in biomedical applications. Applications include implant materials, components of ex vivo circuits, and cosmetic prostheses. Primary emphasis on polymer-based materials and on optimization of parameters of materials which determine their utility in applications such as artificial kidney membranes and artificial arteries. (.5 ED/.5 ES) Prerequisite: Biomedical Engineering 83L, Engineering 83L or Chemistry 151L or consent of instructor. C-L: Mechanical Engineering 215. One course. *H. Clark or Reichert*

216. Transport Phenomena in Cells and Organs. Applications of the principles of mass and momentum transport to the analysis of selected processes of biomedical and biotechnological interest. Emphasis on the development and critical analysis of models of the particular transport process. Topics include: reaction-diffusion processes, trans-

port in natural and artificial membranes, dynamics of blood flow, pharmacokinetics, receptor-mediated processes and macromolecular transport, normal and neoplastic tissue. (.5 ED/ .5 ES) Prerequisite: Biomedical Engineering 207 or equivalent. One course. *Truskey*

222. Principles of Ultrasound Imaging. Propagation, reflection, refraction, and diffraction of acoustic waves in biologic media. Topics include geometric optics, physical optics, attenuation, and image quality parameters such as signal-to-noise ratio, dynamic range, and resolution. Emphasis is placed on the design and analysis of medical ultrasound imaging systems. (.5 ED/ .5 ES) Prerequisites: Physics 52L and Mathematics 111. One course. *von Ramm*

223. Cellular and Integrative Cardiovascular Physiology and Biophysics. Electrical and mechanical properties of the heart at the cellular and organ levels; reflex control of cardiac output; the heart as an endocrine organ; interaction between heart, kidney, and lung; comparative cardiac physiology. Prerequisites: Cell Biology 203 or equivalent and Physics 52L or equivalent; consent of instructor or graduate status. C-L: Cell Biology 223. One course. *Benjamin and staff*

230. Biomechanics. Kinematic models of human motions, mechanical properties of bone and soft tissues, load directed growth mechanisms, human tolerance to impact and vibration, head injury criteria applied to helmet design. (.5 ED/ .5 ES) One course. *McElhanev*

231. Orthopaedic Biomechanics. Biomechanics of hard and soft tissues: nonlinear viscoelastic behavior of tendon and ligament; poroelastic behavior of cartilage and meniscus; continuum modeling of bone. Emphasis will be placed on experimental techniques used to evaluate these tissues. Student seminars on topics in applied biomechanics will be included. (.5 ED/ .5 ES) Prerequisites: Biomedical Engineering 110L or Engineering 75L or equivalent, and Biomedical Engineering 83 or Engineering 83L or equivalent. One course. *Myers*

233. Modern Diagnostic Imaging Systems. The underlying concepts and instrumentation of several modern medical imaging modalities. Review of applicable linear systems theory and relevant principles of physics. Modalities studied include X-ray radiography (conventional film-screen imaging and modern electronic imaging), computerized tomography (including the theory of reconstruction), and nuclear magnetic resonance imaging. Consent of instructor required. (.5 ED/ .5 ES) One course. *Floyd*

235. Acoustics and Hearing. The generation and propagation of acoustic (vibrational) waves and their reception and interpretation by the auditory system. Topics under the heading of generation and propagation include free and forced vibrations of discrete and continuous systems, resonance and damping, and the wave equation and solutions. So that students may understand the reception and interpretation of sound, the anatomy and physiology of the mammalian auditory system are presented; and the mechanics of the middle and inner ears are studied. (.5 ED/ .5 ES) Prerequisites: Physics 52L and Mathematics 111 or equivalents. One course. *Trahey*

237. Biosensors. Biosensors defined as the use of biospecific recognition mechanisms in the detection of analyte concentration. The basic principles of protein binding with specific reference to enzyme-substrate, lectin-sugar, antibody-antigen, and receptor-transmitting binding. Simple surface diffusion and absorption physics at surfaces with particular attention paid to surface binding phenomena. Optical, electrochemical, gravimetric, and thermal transduction mechanisms which form the basis of the sensor design. (.5 ED/ .5 ES) Prerequisites: Biomedical Engineering 215 and consent of instructor. One course. *Reichert*

241. Artificial Intelligence in Medicine. Basic concepts of artificial intelligence (AI) and in-depth examination of medical applications of AI. Knowledge of heuristic programming; brief examination of classic AI programming languages (LISP and PROLOG) and AI programming; rule-based systems and cognitive models. (.5 ED/ .5 ES) One course. *Hammond*

244. Mathematical Models of Physiological Systems. Mathematical modeling and computer simulation of physiological and other biomedical systems. Formulation of quantitative models of physiological processes using methods drawn from a variety of engineering disciplines including transport phenomena, feedback control, and continuum mechanics. Digital techniques for the solution of coupled nonlinear equations, emphasizing systems of ordinary and partial differential equations. Selected readings from the literature covering current models of cardiovascular, renal, neural, respiratory, and sensory systems. (.5 ED/ .5 ES) Prerequisite: Mathematics 111 or equivalent. One course. *Pasipoularides*

250. Cardiovascular Mechanics. Mechanical principles and their applications in the human circulatory system. The coupling of solid and fluid behavior in cardiovascular organs is emphasized. Topics include: gravity and the circulation, kinematics of blood flow and circulatory volume balances, peripheral resistance, wall stresses and deformations, cardiac cycle and cardiac work, circulatory wave propagation, unsteady velocity profiles and boundary layers. Special student projects involve the design of diagnostic and therapeutic instruments and devices for cardiovascular applications. (.5 ED/ .5 ES) Prerequisites: Biomedical Engineering 110 and Mathematics 111 or equivalent. One course. *Pasipoularides*

255. Safety of Medical Devices. Safety of medical devices such as prosthetic heart valves and silicone breast implants. Engineering analysis of the safety of biomedical instrumentation in the context of the regulations of the U.S. Food and Drug Administration. Engineering performance standards and FDA requirements for clinical trials for selected medical devices such as medical diagnostic ultrasound, surgical lasers, and prosthetic heart valves. Students will prepare a mock application for FDA premarket approval to demonstrate safety of a selected medical device. (.25 ED/ .75 ES) Prerequisite: Biomedical Engineering 164L or equivalent or consent of instructor. One course. *S. Smith*

264. Medical Instrument Design. General principles of signal acquisition, amplification processing, recording, and display in medical instruments. System design, construction, and evaluation techniques will be emphasized. Methods of real-time signal processing will be reviewed and implemented in the laboratory. Each student will design, construct, and demonstrate a functional medical instrument and collect and analyze data with that instrument. Formal write-ups and presentations of each project will be required. (.75 ED/ .25 ES) Prerequisite: Biomedical Engineering 164 or equivalent or senior standing. One course. *Trahey*

265. Advanced Topics in Biomedical Engineering. Advanced subjects related to programs within biomedical engineering tailored to fit the requirements of a small group. Consent of instructor required. (.5 ED/ .5 ES) One course. *Staff*

COURSES CURRENTLY UNSCHEDULED

132. Statistical and Computational Methods in Signal Processing

204. Measurement and Control of Cardiac Electrical Events

206L. Microprocessors and Digital Instruments

243. Introduction to Medical Informatics

THE MAJOR

The major requirements are included in the minimum total of thirty-four courses listed under general requirements and departmental requirements. The following specific courses must be included: Biomedical Engineering 101, 163, 164, and 207.

Civil and Environmental Engineering (CE)

Professor Petroski, *Chair*; Associate Professor Pas, *Director of Undergraduate Studies*; Professors Haff, Melosh, S. Utku, Vesilind, and J. F. Wilson; Associate Professors Hueckel, Medina, Peirce, and Reckhow; Assistant Professors Faust, Jacobs, Laursen, and Virgin; Professor Emeritus Brown; Associate Research Professor Biswas; Adjunct Associate Professors Bryers and B. Utku

A major in civil engineering is available in this department.

The infrastructure that makes up what we refer to as civilization is, for the most part, the work of civil and environmental engineers. Improving, or even maintaining, the quality of life is ever more challenging as urban problems in the industrialized nations of the world intensify, while rapid urbanization in many developing countries creates other problems for the civil and environmental engineer. The planning, design, construction, and maintenance of necessary facilities, in an era of increasingly scarce monetary and other resources, demands civil and environmental engineers dedicated to work for the public good and prepared to seek more efficient and effective solutions.

The challenges faced by civil and environmental engineers vary widely in nature, size, and scope, and encompass both the public and private sectors. Examples include: space structures and launch facilities, hazardous waste disposal facilities, water supply and treatment facilities, power plants, bridges, dams, buildings, tunnels, highways, subways, seaports, airports, and offshore structures. The professors of the Department of Civil and Environmental Engineering at Duke strive to educate their students to assume leadership roles in their chosen careers as well as to recognize their professional and personal obligations to the broader society and culture. The faculty strives to provide a holistic educational experience where the humanities and the physical and social sciences form the foundation for the critical thinking and skills that allows graduates to enjoy the benefits of a liberal education.

Students can emphasize any one of the specialty areas in which the faculty is engaged in teaching and research, including: environmental engineering, structural engineering and mechanics, transportation and systems engineering, water resources, and geotechnical engineering. The department also offers a program in architectural engineering. Students may also enroll in the BSE/MBA degree program and after five years of study obtain an engineering degree and an MBA degree from Duke's Fuqua School of Business. In addition, students may pursue a degree in civil engineering coupled with a double major in another department at Duke. Examples of recently completed double majors reflect the breadth of interests shared by civil and environmental engineering students at Duke: public policy studies, economics, French, mathematics, and music.

The civil and environmental program at Duke is built upon the expertise and experience of a prominent faculty and is supported by commensurate laboratory and instructional facilities. The civil and environmental engineering professors are committed to providing quality classroom instruction, advising, and laboratory experiences in settings that encourage student-faculty as well as student-student interactions. The faculty conducts research of national and international consequence, and undergraduates have ample opportunities to be involved in such research, through undertaking independent study projects and/or by working as research assistants. The research facilities in the department, including laboratory

equipment and instrumentation as well as computer resources, are comparable to those found in other major universities.

Graduates of the Department of Civil and Environmental Engineering are able to select from a wide range of career paths. Some recent graduates have pursued advanced study in engineering, business, law, and architecture, while others have accepted positions with major corporations and federal, state, and local government agencies as design engineers and project managers.

116. Transportation Engineering. The role and history of transportation. Introduction to the planning and design of multimodal transportation systems. Principles of traffic engineering and route location and design. Planning studies and economic evaluation. (.5 ED/.5 ES) Prerequisites: Statistics 113 and consent of instructor for nonengineering students. One course. *Pas*

122L. Fluid Mechanics. Physical properties of fluids; fluid-flow concepts and basic equations; continuity, energy, and momentum principles; dimensional analysis and dynamic similitude; viscous effects; applications emphasizing real fluids. Selected laboratory work. (.3 ED/.7 ES) Corequisite: Engineering 123L. One course. *Jacobs or Medina*

123L. Water Resources Engineering. Descriptive and quantitative hydrology, hydraulics of pressure conduits and measurement of flow, compound pipe systems, analysis of flow in pressure distribution systems, open channel flow, reservoirs and distribution system storage. Groundwater hydrology and well-hydraulics. Probability and statistics in water resources. Selected laboratory and field exercises, computer applications. (.15 ED/.85 ES) Prerequisite: Civil Engineering 122L. One course. *Medina*

124L. Environmental Engineering. Qualitative and quantitative physical, chemical, and bacteriological characterization of water and wastewater. Introduction to water treatment processes and wastewater collection, treatment and disposal systems. Air pollution control; solid and hazardous waste management. Laboratory included. Field trips to be arranged. (.75 ED/.25 ES) Prerequisite: Civil Engineering 123L. One course. *Pearce or Vesilind*

127. Environmental Pollution Control. A study of the environmental causes and effects of air, land, and water pollution. Interactions between the environment and stresses to which it is subjected as a consequence of growth and concentration of populations and their increasing demands on natural resources. Solid waste, recycling, noise pollution, and environmental ethics. Not open to engineering majors. (1.0 ES) One course. *Vesilind*

131L. Theory of Structures. Application of mechanics to the analysis of plane and space structures; a unified treatment of statically determinate and indeterminate structural systems. (.3 ED/.7 ES) Prerequisites: Engineering 75L and Mathematics 103. One course. *Biswas or S. Utku*

133L. Structural Design I. Nonhomogenous materials. Determination of physical and mechanical properties of construction materials. Theory and design of compression and flexural members. Emphasis on ultimate strength theory for concrete. Timber design using mechanical fasteners. Laboratory exercises include concrete aggregate evaluation, concrete mix design, and structural timber tests. (1.0 ED) Prerequisite: Civil Engineering 131L. One course. *Biswas*

134L. Structural Design II. Design in metals, primarily steel. Properties of materials as criteria for failure. Tension, compression, and flexural members. Bolted and welded connections, including eccentric connections. Built-up members. Design by elastic and plastic methods. Selected problems to include computations and drawings. (1.0 ED) Prerequisite: Civil Engineering 131L. One course. *Biswas*

139L. Introduction to Soil Mechanics. Origin and composition of soils, soil structure. Flow of water through soils; capillary and osmotic phenomena. Environmental geotechnology. Soil behavior under stress; compressibility, shear strength. Elements of mechanics of soil masses with application to problems of bearing capacity of foundations, earth pressure on retaining walls, and stability of slopes. Laboratory included. (5 ED/.5 ES) Prerequisite: Civil Engineering 122L. One course. *Hueckel*

141, 142. Special Topics in Civil Engineering. Study arranged on a special topic in which the instructor has particular interest and competence. Consent of instructor and director of undergraduate studies required. Half course or one course. Variable credit. *Staff*

161. Architectural Engineering I. Analysis of the building through the study of its subsystems (enclosure, space, structural, environmental-control). Building materials and their principal uses in the enclosure and structural subsystems. Computer aided design. Field trips. (5 ED/.5 ES) Prerequisite: junior or senior standing, consent of instructor for nonengineering students. One course. *B. Utku*

162. Architectural Engineering II. Design and integration of building subsystems (enclosure, space, structural, environmental-control) in the design of a medium-sized building. (1.0 ED) Prerequisite: Civil Engineering 161 or consent of instructor. One course. *B. Utku*

192. Civil Engineering Design. Student design teams complete a preliminary design of an actual civil engineering project and present the design to a panel of civil engineering faculty and practitioners. A written technical report is required. Topics to be addressed include: the design process; cost estimation; legal, ethical, and social aspects of professional engineering practice; short-term and long-term design serviceability considerations. Open only to civil engineering students during their final two semesters. (1.0 ED) One course. *Jacobs*

197, 198. Projects in Civil Engineering. These courses may be taken by junior and senior engineering students who have demonstrated aptitude for independent work. Consent of instructor and director of undergraduate studies required. Half course or one course each. Variable credit. *Jacobs*

201. Advanced Mechanics of Solids. Tensor fields and index notation. Analysis of states of stress and strain. Conservation laws and field equations. Constitutive equations for elastic, viscoelastic, and elastic-plastic solids. Formulation and solution of simple problems in elasticity, viscoelasticity, and plasticity. (1.0 ES) One course. *Hueckel, Laursen, or Petroski*

203. Plasticity. Inelastic behavior of soils and engineering materials. Yield criteria. Flow rules. Concepts of perfect plasticity and plastic hardening. Methods of rigid-plasticity. Limit analysis. Isotropic and kinematic hardening. Plastic softening. Diffused damage. Thermo-plasticity. Visco-plasticity. (1.0 ES) Prerequisite: Civil Engineering 201 or consent of instructor. One course. *Hueckel*

204. Plates and Shells. Differential equation and extremum formulations of linear equilibrium problems of Kirchhoffian and non-Kirchhoffian plates of isotropic and orthotropic material. Solution methods. Differential equation formulation of thin shell problems in curvilinear coordinates; membrane and bending theories; specialization for shallow shells, shells of revolution, and plates. Extremum formulation of shell problems. Solution methods. (1.0 ES) Prerequisites: Engineering 75L or 135 and Mathematics 111. One course. *Utku*

205. Elasticity. Introduction to linear theory of elasticity. Constitutive equations for anisotropic and isotropic elastic solids. Formulation and solution of torsion, bending,

and flexure problems. Plane, axisymmetric, and three-dimensional problems. (1.0 ES)
One course. *Petroski*

207. Transport Phenomena in Biological Systems. (.25 ED/.75 ES) See C-L: Biomedical Engineering 207; also C-L: Mechanical Engineering 207. One course. *Truskey*

209. Kinetics and Reactor Design. (.5 ED/.5 ES) Prerequisite: Mathematics 111 or consent of instructor. See C-L: Biomedical Engineering 209. One course. *Staff*

210. Intermediate Dynamics. (.25 ED/.75 ES) See C-L: Mechanical Engineering 210. One course. *Knight or Virgin*

215. Engineering Systems Analysis. Fundamental concepts and tools for engineering systems analysis, including optimization techniques and decision analysis. System definition and model formulation, optimization by calculus, linear programming, integer programming, separable integer programming, nonlinear programming, network analysis, dynamic programming, and decision analysis. Application to diverse engineering systems. (.25 ED/.75 ES) One course. *Pas*

217. Transportation Systems Analysis. The transportation systems planning process. Quantitative analysis; mathematical modeling and computer simulation techniques for short-and long-range planning and evaluation of transportation systems. (1.0 ES) Prerequisite: (or corequisite) Civil Engineering 116 or consent of instructor. One course. *Pas*

218. Engineering Management and Project Evaluation. Statistical analysis and economics. Data organization, distributions, estimates of parameters, hypothesis testing, analysis of variance, experimental design. Economic impact assessment, supply and demand forecasting, benefit/cost analysis, economic incentives, public and private finance, input/output analysis. (1.0 ES) One course. *Peirce*

221. Engineering Systems Reliability, Safety, and Risk Assessment. Introduction to the concepts of design reliability and safety. Topics include: concepts of probability in engineering planning and design, decision analysis and assessment of reliability, modeling and analysis of uncertainty, reliability-based design, multiple failure mode analysis, redundant and nonredundant systems, and fault tree analysis. Emphasis on determining the probability of failure for numerous engineering systems including structural systems, infrastructure systems, water treatment systems, environmental systems, and transportation networks. (.5 ED/.5 ES) Prerequisite: Mathematics 111 or consent of instructor. One course. *Jacobs*

225. Dynamic Engineering Hydrology. Dynamics of the occurrence, circulation, and distribution of water; climate, hydrometeorology, geophysical fluid motions. Precipitation, surface runoff and stream flow, infiltration, water losses. Hydrograph analysis, catchment characteristics, hydrologic instrumentation, and computer simulation models. (1.0 ES) Prerequisite: Civil Engineering 122L or consent of instructor. One course. *Medina*

227. Groundwater Hydrology and Contaminant Transport. Review of surface hydrology and its interaction with groundwater. The nature of porous media, hydraulic conductivity, and permeability. General hydrodynamic equations of flow in isotropic and anisotropic media. Water quality standards and contaminant transport processes: advective-dispersive equation for solute transport in saturated porous media. Analytical and numerical methods, selected computer applications. Deterministic versus stochastic models. Applications: leachate from sanitary landfills, industrial lagoons and ponds, subsurface wastewater injection, monitoring of groundwater contamination. Conjunctive surface-subsurface models. (.1 ED/.9 ES) Prerequisite: Civil Engineering 123L or consent of instructor. One course. *Medina*

233. Prestressed Concrete Design. A critical review of research and recent developments in prestressed concrete design. Prestressed tanks, beams, and columns; partial prestressing and composite design. (1.0 ED) Prerequisite: Civil Engineering 133L. One course. *Biswas*

237. Advanced Soil Mechanics. Characterization of behavior of geomaterials. Stress-strain incremental laws. Nonlinear elasticity, hypo-elasticity, plasticity and viscoplasticity of geomaterials; approximated laws of soil mechanics; fluid-saturated soil behavior; cyclic behavior of soils; liquefaction and cyclic mobility; elements of soil dynamics; thermal effects on soils. (1.0 ES) Prerequisite: Civil Engineering 139L or equivalent. One course. *Hueckel*

240. Fate of Organic Chemicals in the Aquatic Environment. Kinetic, equilibrium, and analytical approaches applied to quantitative description of processes affecting the fate of anthropogenic and natural organic compounds in surface and groundwaters and in selected treatment processes, including sorption phenomena, gas transfer, hydrolysis, photochemistry, oxidation-reduction, and biodegradation. Sampling, detection, identification, and quantification of organic compounds in the environment. Gas and liquid chromatography and mass spectrometry. (1.0 ES) Prerequisites: university-level general chemistry and organic chemistry within last four years. C-L: Environment 240. One course. *Dubay and Faust*

241. Atmospheric Chemistry and Air Pollution. Chemical kinetics and equilibrium applied to the mechanistic and quantitative description of processes affecting the fates of anthropogenic and natural chemicals in the troposphere, on local, regional, and global scales. Direct photolysis; gas-phase photo-formation and fates of ozone, radicals, and other oxidants; gas-phase oxidations of volatile organic compounds; gas-to-drop partitioning; aqueous-phase photoformation and fates of hydrogen peroxide, radicals, and other oxidants in the aqueous phases of clouds, fogs, and aerosols; effects of aqueous-phase reactions on the chemical composition of the troposphere; gas-phase and aqueous-phase oxidations of organic and inorganic compounds; stratospheric ozone depletion. (1.0 ES) Prerequisites: university-level general chemistry and organic chemistry within last four years. C-L: Environment 241. One course. *Faust*

242. Environmental Aquatic Chemistry. Principles of chemical kinetics and equilibria applied to quantitative description of the chemistry of lakes, rivers, oceans, groundwaters, and selected treatment processes. Equilibrium, steady state, and other kinetic models applied to processes such as the carbonate system, coordination chemistry, precipitation and dissolution, oxidation-reduction, photochemistry, adsorption, and heterogeneous reactions. (1.0 ES) Prerequisite: university-level general chemistry within last four years. C-L: Environment 242. One course. *Faust*

243. Physicochemical Unit Operations in Water Treatment. Fundamental bases for design of water and waste treatment systems, including transport, mixing, sedimentation and filtration, gas transfer, coagulation, and absorption processes. Emphasis on physical and chemical treatment combinations for drinking water supply. (.25 ED / .75 ES) Prerequisite: Civil Engineering 124L. One course. *Vesilind*

244. Applied Microbial Processes. Existing and novel microbial processes as they pertain to biotechnological products, specialty bioconversions, and to treat or exploit wastes. Concepts of microbiology, chemical engineering, the stoichiometry and kinetics of complex microbial metabolism, and process analysis. Specific processes such as carbon oxidation, vinegar and alcohol production, nitrification, methane production, biological electricity generation, recombinant protein secretion, and wastewater treatment in long-term space travel are discussed. Consent of instructor required. (.25 ED / .75 ES) One course. *Staff*

245. Pollutant Transport Systems. Distribution of pollutants in natural waters and the atmosphere; diffusive and advective transport phenomena within the natural environment and through artificial conduits and storage/treatment systems. Analytical and numerical prediction methods. (.1 ED/.9 ES) Prerequisites: Civil Engineering 122L and Mathematics 111 or equivalents. One course. *Medina*

246. Water Supply Engineering Design. The study of water resources and municipal water requirements including reservoirs, transmission, treatment and distribution systems; methods of collection, treatment, and disposal of municipal and industrial wastewaters. The course includes the preparation of a comprehensive engineering report encompassing all aspects of municipal water and wastewater systems. Field trips to be arranged. (1.0 ED) Prerequisite: Civil Engineering 124L or consent of instructor. One course. *Vesilind*

248. Solid Waste Engineering. Engineering design of material and energy recovery systems including traditional and advanced technologies. Sanitary landfills and incineration of solid wastes. Application of systems analysis to collection of municipal refuse. Major design project in solid waste management. (1.0 ED) Prerequisite: Civil Engineering 124L or consent of instructor. C-L: Environment 248. One course. *Vesilind*

249. Control of Hazardous and Toxic Waste. Engineering solutions to industrial and municipal hazardous waste management problems. Handling, transportation, storage, and disposal technologies. Biological, chemical, and physical processes. Upgrading an abandoned disposal site. Economic and regulatory aspects. Case studies. Consent of instructor required. (.50 ED/.50 ES) One course. *Peirce*

251. Systematic Engineering Analysis. Mathematical formulation and numerical analysis of engineering systems with emphasis on theory of structures. Equilibrium and eigenvalue problems in distributed and discrete spaces; properties of these systems and discretization of systems in continuum by the trial functions with undetermined parameters. The use of weighted residual methods, finite elements, and finite differences. (1.0 ES) Prerequisite: senior or graduate standing. One course. *S. Utku*

252. Buckling of Engineering Structures. An introduction to the underlying concepts of elastic stability and buckling, development of classical (differential equation) and modern (energy) approaches, buckling of common engineering components including link models, struts, frames, plates, and shells. Consideration will also be given to inelastic behavior, postbuckling, and design implications. (.25 ED/.75 ES) Prerequisite: Civil Engineering 131L or consent of instructor. C-L: Mechanical Engineering 252. One course. *Biswas or Virgin*

254. Introduction to the Finite Element Method. Investigation of the finite element method as a numerical technique for solving linear ordinary and partial differential equations, using rod and beam theory, heat conduction, elastostatics and dynamics, and advective/diffusive transport as sample systems. Emphasis placed on formulation and programming of finite element models, along with critical evaluation of results. Topics include: Galerkin and weighted residual approaches, virtual work principles, discretization, element design and evaluation, mixed formulations, and transient analysis. (1.0 ES) Prerequisites: a working knowledge of ordinary and partial differential equations, numerical methods, and programming in FORTRAN. One course. *Laursen*

257. Structural Optimization. Computer-aided improvement of structural designs; redesign search processes, sensitivity analysis, integrity analysis; optimization of static, steady-state, and transient response systems; minimization of structural weight and response potentials for trusses, frames, and continua. (.65 ED/.35 ES) One course. *Staff*

265. Advanced Topics in Civil and Environmental Engineering. Opportunity for study of advanced subjects relating to programs within the civil and environmental

engineering department tailored to fit the requirements of individuals or small groups. One course. *Staff*

281. Experimental Systems. Formulation of experiments; Pi theorem and principles of similitude; data acquisition systems; static and dynamic measurement of displacement, force, and strain; interfacing experiments with digital computers for data storage, analysis, and plotting. Students select, design, perform, and interpret laboratory-scale experiments involving structures and basic material behavior. (.3 ED/.7 ES) Prerequisite: senior or graduate standing in engineering or the physical sciences. One course. *J. F. Wilson*

283. Structural Dynamics. Formulation of dynamic models for discrete and continuous structures, normal mode analysis, deterministic and stochastic responses to shocks and environmental loading (earthquakes, winds, and waves), introduction to nonlinear dynamic systems, analysis and stability of structural components (beams and cables and large systems such as offshore towers, moored ships, and floating platforms). (1.0 ES) One course. *J. F. Wilson*

COURSES CURRENTLY UNSCHEDULED

202. Advanced Mechanics of Solids II

212. Mechanical Behavior and Fracture of Materials

216. Transportation Planning and Policy Analysis

226. Operational Hydrology

228L. Sludge Management and Disposal

232. Reinforced Concrete Design

234. Advanced Structural Design in Metals

235. Foundation Engineering

236. Earth Structures

238. Rock Mechanics

239. Physical Properties of Soils

247. Air Pollution Control

258. Analysis of Dynamic and Nonlinear Behavior of Structures

THE MAJOR

The major requirements are included in the minimum of thirty-four courses listed under general requirements and departmental requirements. The following specific courses must be included: Engineering 24L, 25L, 75L, 115, 123L, and 150L; Civil Engineering 122L, 131L, and 192.

Electrical Engineering (EE)

Professor Casey, *Chair*; Visiting Professor McCumber, *Director of Undergraduate Studies*; Professors Fair, Gelenbe, Joines, Marinos, Nolte, Trivedi, and Wang; Associate Professors Alexandrou, Kedem, Krolik, and Massoud; Assistant Professors Board, Daniels-Race, Dollas, George, Hansen, and Overhauser; Professors Emeritus Owen and Wilson; Assistant Research Professors Bottomley and Ybarra; Adjunct Professors Glomb, Lontz, and Strocio; Adjunct Associate Professors Derby and Kanapoulos; Adjunct Assistant Professors Goodwin-Johansson, Loeb, Spanos, and Strole; Visiting Professor Iafrate

A major is available in this department.

Electrical engineering is a broadly-based discipline dealing with the processing, control, and transmission of information and energy by making use of electrical and electromagnetic phenomena. Electrical engineers design, build, and make extensive use of computers. The twenty-first century will have continuing demands for electronic systems in most industrial and consumer products.

Graduates with electrical engineering backgrounds are prepared for their first job in engineering or management as well as to undertake graduate or professional school education in a variety of disciplines. The curriculum permits students to concentrate in such areas as computer engineering, signal processing and communications, solid-state electronics and circuits, electromagnetic fields and optics, and electronic systems. The flexibility of the undergraduate curriculum permits students to complete the requirements for a second major in such areas as biomedical engineering, computer science, physics, mathematics, history, public policy studies, and many others. Students with interests such as premedicine, prelaw, economics, art, music, psychology, and social sciences can be accommodated within the curriculum through individually designed programs. The classroom lectures are enhanced by extensive use of the department's computer and laboratory facilities. The department maintains over eighty networked computer workstations, servers, and X-terminals interconnected via an Ethernet network which also gives access to campus, regional, and international data networks, including the Internet. The instructional computers include an IBM RS-6000 series machine, Sun SPARC Classic workstations and servers for advanced computer-aided design (CAD), HP 9000 series workstations, and X-terminals allow access to various computer clusters in the Engineering Building as well as some three dozen departmental Sun, DEC, and IBM workstations.

Numerous undergraduate laboratories are well-equipped with electronic components, digitizing oscilloscopes, PC controlled instrumentation, and commercial quality CAD tools, as well as equipment such as logic analyzers used in computer logic design. Laboratories and equipment are also available for microprocessor and computer architecture studies, rapid system prototyping, custom integrated circuit design and testing, integrated circuit fabrication, digital speech processing, image processing, robotics, digital communications, microwaves, and power electronics. These laboratories are important to the undergraduate program since they permit students to become actively acquainted with the devices and design tools of electrical engineering through regularly scheduled experiments, independent projects, and occasionally, part-time assistance to faculty members engaged in research. Opportunities for independent study are related to the current areas of research which are: computer engineering, computer architecture, fault-tolerant computer systems, scientific computing, parallel processing, VLSI CAD tools, signal processing, digital speech processing, signal detection and estimation, ocean acoustic signal processing, image processing, solid-state electronics, integrated circuit processing and process simulation, molecular-beam epitaxy, III-V compound semiconductor materials and devices, machine intelligence, applications of electromagnetic fields and waves, power electronics and magnetics.

61L. Introduction to Electronic Circuits. Techniques for analyzing linear circuits. Nodal and mesh analysis, superposition and linearity, Thevenin and Norton equivalent circuits, operational amplifiers, energy storage, transient analysis, phasors and impedance, RMS values, AC power, frequency response, resonance, and filters. Circuit simulation using SPICE. (.25 ED / .75 ES) Prerequisite: Mathematics 32. One course. *Staff*

62L. Introduction to Electronics: Devices. Integrated-circuit fabrication. Fundamentals of semiconductor physics. Device modeling. Basic device operation, $I(V)$ characteristics, temperature effects, capacitance effects, equivalent circuit and SPICE models, high-frequency and switching properties of: PN junction diodes, Schottky barriers, bipolar-junction transistors, MOS capacitors, and field-effect transistors. Basic electronic

circuits; electronic-circuit analysis and design. (.5 ED/.5 ES) Prerequisite: Electrical Engineering 61. One course. *Staff*

64. Fundamentals of Linear System Theory. Signal representations, system response, convolution, correlation; Fourier series and transforms, transfer functions; Laplace transforms, state variables, stability; discrete signals and transforms, fast Fourier transform; z transforms. Applications to networks, modulation, sampling, filtering. Computer solutions of problems using MAPLE and SPICE. (1.0 ES) Prerequisite: Electrical Engineering 61L. One course. *Staff*

141. Linear Control Systems. Analysis and design of feedback control systems. Block diagram and signal flow graph system models. Servomechanism characteristics, steady-state errors, sensitivity to parameter variations and disturbance signals. Time domain performance specifications. Stability. Root locus, Nyquist, and Bode analysis; design of compensation circuits; closed loop frequency response determination. Introduction to time domain analysis and design. (.50 ED/.50 ES) Prerequisite: Electrical Engineering 64 or consent of instructor. One course. *Wang*

142. Introduction to Robotics and Automation. Fundamental notions in robotics, basic configurations of manipulator arm design, coordinate transformations, control functions, and robot programming. Applications of artificial intelligence, machine vision, force/torque, touch and other sensory subsystems. Design for automatic assembly concepts, tools, and techniques. Application of automated and robotic assembly costs, benefits, and economic justification. Selected laboratory and programming assignments. (.25 ED/.75 ES) Prerequisites: Electrical Engineering 64 and consent of instructor. One course. *Staff*

151. Introduction to Switching Theory and Logic Design. Techniques for the analysis and design of combinational and sequential networks. Discrete mathematical systems, binary arithmetic, Boolean algebra, minimization of functions, synchronous and fundamental mode sequential circuit design, design with MSI and LSI components, and special properties of switching functions are covered. Selected laboratory work. (.25 ED/.75 ES) C-L: Computer Science 120. One course. *Marinos or Overhauser*

152. Introduction to Computer Architecture. Architecture and organization of digital computer systems. Processor operation, computer arithmetic, instruction set design. Assembly language programming. Selected hardware and software exercises culminating in design and construction of a complete computer system. Not open to students who have taken Computer Science 104. (.75 ED/.25 ES) Prerequisite: Electrical Engineering 151. One course. *Board or Dollas*

156. Computer Network Architecture. The architecture of computer communication networks and the hardware and software required to implement the protocols that define the architecture. Basic communication theory, transmission technology, private and common carrier facilities. International standards. Satellite communications and local area networks. Performance analysis and modeling of communication networks. (.25 ED/.75 ES) Prerequisite: Electrical Engineering 151. One course. *Strole*

163L. Introduction to Electronics: Integrated Circuits. Analysis and design of electronic circuits in bipolar and MOS technologies, with emphasis on both large-signal and small-signal methods. Circuits for logic gates, latches, and memories. Single-stage and multistage amplifiers and op amps. Circuits with feedback, including stability and frequency response considerations. Analog and mixed analog/digital circuit applications. Extensive use of SPICE for circuit simulation. (.75 ED/.25 ES) Prerequisite: Electrical Engineering 62. One course. *Derby or George*

164L. Electronic Design Projects. Electronics project laboratory in which individuals or small teams, build, and test custom designed circuits or small systems to gain

experience in the design process. Requirements: a written plan, project organization, a written report describing the project and test results, a presentation to the class of the constructed project. Enrollment limited to 20. (1. ED) Prerequisites: Electrical Engineering 163 and at least one of 141, 151, or 181. One course. *Staff*

170. Introduction to Electromagnetic Fields. Postulatory treatment of electromagnetic fields based on Maxwell's equations. Discussion of the Lorentz force equation and the Poynting theorem. Treatment of propagation, reflection, and transmission of plane waves through various media and dielectric interfaces. Introduction to electrostatic and magnetostatic fields and potential functions. (.25 ED / .75 ES) Prerequisites: Mathematics 104 or 111 and Physics 52L. One course. *Joines*

171. Applications of Electromagnetic Fields and Waves. Solution techniques applied to static and dynamic field problems. Discussions and example applications include the following topics: waves and transmission lines, waveguides and resonators, antennas and radiation, and electromagnetic forces and energy. (.50 ED / .50 ES) Prerequisite: Electrical Engineering 170. One course. *Joines*

176. Thermal Physics. Thermal properties of matter treated using the basic concepts of entropy, temperature, chemical potential, partition function and free energy. Topics include the laws of thermodynamics, ideal gases, thermal radiation and electrical noise, heat engines, Fermi-Dirac and Bose-Einstein distributions, semiconductor statistics, kinetic theory, and phase transformations. (1.0 ES) Prerequisites: Physics 51L, 52L or equivalent and Mathematics 103 or equivalent. C-L: Physics 176. One course. *McCumber or Teitsworth*

181. Fundamentals of Signal Processing and Communications. The fundamentals of signal representation and system characterization used in digital signal processing and communications. Communication systems: basic concepts in amplitude modulation, frequency division multiplexing, amplitude shift keying, pulse code modulation, matched filtering. Discrete-time signal processing: discrete-time systems, response with noisy excitation, introduction to digital filter design, discrete Fourier transform, fast Fourier transform. Computer applications in selected areas using MATLAB. (.25 ED / .75 ES) Prerequisites: Electrical Engineering 64 and Mathematics 135 or Statistics 113, or consent of instructor. One course. *Alexandrou, Hansen, or Nolte*

182. Digital Filter Design. A treatment of the theory and application of processing of discrete time data. Special attention will be given to the design and implementation of both finite impulse response (FIR) and infinite impulse response (IIR) digital filters. Bilinear transformations, filter design based on Butterworth, Chebyshev, and elliptic approximations, transversal filters, effects of quantization and finite word length arithmetic in digital filters. Applications of digital signal processing in such areas as image, sonar/radar, and speech communications. (.75 ED / .25 ES) Prerequisite: Electrical Engineering 181. One course. *Alexandrou, Hansen, or Nolte*

187. Digital Telecommunications. Examination of existing telephone networks in the U.S. with emphasis on the transition from analog to digital systems. Sequential processes of encoding, transmission, switching, and network hierarchy. Consideration of the problems which must be solved in the transition from analog to digital networks. (.50 ED / .50 ES) Prerequisite: Electrical Engineering 181. One course. *Glomb*

189. Image Processing. Basic concepts of the manipulation and analysis of images by computer, linear operations on pictures, Fourier transform and 2-D Z-transform, hexagonal sampling theorem, image transforms, image enhancement, image filtering and restoration, image coding, matching, segmentation, representation and description. Project presentation by students. (.50 ED / .50 ES) Prerequisites: Electrical Engineering 181 and Mathematics 135. One course. *Staff*

191, 192. Undergraduate Research in Electrical Engineering. For juniors only. (Var. ED/ES) Half course or one course each. Variable credit. *Staff*

193, 194. Undergraduate Research in Electrical Engineering. For seniors only. (Var. ED/ES) Half course or one course each. Variable credit. *Staff*

195, 196. Special Topics in Electrical Engineering. Study of selected topics in electrical engineering tailored to fit the requirements of a small group. Consent of instructor and director of undergraduate studies required. (Var. ED/ES) Half course or one course each. Variable credit. *Staff*

197, 198. Projects in Electrical Engineering. A course which may be undertaken only by seniors who are enrolled in the graduation with distinction program or who show special aptitude for individual project work. Elective for electrical engineering majors. Consent of director of undergraduate studies required. (Var. ED/ES) Half course to two courses each. Variable credit. *Staff*

211. Quantum Mechanics. Discussion of wave mechanics including elementary applications, free particle dynamics, Schrödinger equation including treatment of systems with exact solutions, and approximate methods for time-dependent quantum mechanical systems with emphasis on quantum phenomena underlying solid-state electronics and physics. (1.0 ES) Prerequisite: Mathematics 111 or equivalent. One course. *Staff*

214. Introduction to Solid-State Physics. Discussion of solid-state phenomena including crystalline structures, X-ray and particle diffraction in crystals, lattice dynamics, free electron theory of metals, energy bands, and superconductivity, with emphasis on understanding electrical and optical properties of solids. (.25 ED/.75 ES) Prerequisite: quantum physics at the level of Physics 143L or Electrical Engineering 211. C-L: Physics 214. One course. *Teitsworth*

215. Semiconductor Physics. A quantitative treatment of the physical processes that underlie semiconductor device operation. Topics include band theory and conduction phenomena; equilibrium and nonequilibrium charge carrier distributions; charge generation, injection, and recombination; drift and diffusion processes. (.25 ED/.75 ES) Prerequisite: Electrical Engineering 211 or consent of instructor. One course. *Daniels-Race*

216. Devices for Integrated Circuits. Derivation of basic semiconductor properties such as the effective mass, effective density of states, SHR recombination, avalanche breakdown and energy-band diagrams. Application of the continuity equation, Gauss' law, and Poisson's equation to obtain the I-V and C-V behavior of Si and GaAs Schottky barriers, GaAs MESFETs; Si JFETs, bipolar transistors and MOSFETs. Relation of device physics to SPICE parameters. Four laboratory exercises. (.25 ED/.75 ES) One course. *Casey*

217. Analog Integrated Circuits. Analysis and design of analog integrated circuits. Bipolar and MOSFET circuits. SPICE models. Elementary integrated amplifier circuits, performance of operational amplifiers and other analog circuits including frequency response and noise. A/D converters and switched capacitor filters. (.50 ED/.50 ES) Prerequisite: Electrical Engineering 216. One course. *Staff*

218. Integrated Circuit Engineering. Basic processing techniques and layout technology for integrated circuits. Photolithography, diffusion, oxidation, ion implantation, and metallization. Design, fabrication, and testing of integrated circuits. (.50 ED/.50 ES) Prerequisite: Electrical Engineering 216. One course. *Fair*

219. Digital Integrated Circuits. Analysis and design of digital integrated circuits. MOSFET and bipolar devices. SPICE models. Major logic families such as NMOS, CMOS, TTL, ECL, and I^2L as well as regenerative logic circuits and memories. Circuit

design considerations for VLSI. (.50 ED / .50 ES) Prerequisites: Electrical Engineering 151 and 216. One course. *Massoud*

243. Pattern Classification and Recognition. Parameter estimation and supervised learning, nonparametric techniques, linear discriminant functions, clustering, language theory related to pattern recognition, examples from areas such as character and severe weather recognition, classification of community health data, recognition of geometrical configurations, algorithms for recognizing low resolution touch-sensor array signatures and 3-D objects. Consent of instructor required. (.50 ED / .50 ES) One course. *Wang*

245. Digital Control Systems. Review of traditional techniques used for the design of discrete-time control systems; introduction of "nonclassical" control problems of intelligent machines such as robots. Limitations of the assumptions required by traditional design and analysis tools used in automatic control. Consent of instructor required. (.25 ED / .75 ES) One course. *Myers*

251. Advanced Digital System Design. Theory and hands-on experience in advanced digital system design. High-speed design, high complexity design (more than 10,000 gates), implementation technology selection, system modeling, power and clock distribution, line termination, and cooling. Case studies and demonstrations. Extensive use of CAD tools for logic minimization, logic synthesis, and system simulation. Rapid system prototyping with off-the-shelf and custom components. Laboratory exercises and a semester project. (.75 ED / .25 ES) Prerequisites: Electrical Engineering 151 and 161. One course. *Dollas*

252. Advanced Digital Computer Architecture. A second course on computer architecture. Definition of high-performance computing. The von Neumann bottleneck, Amdahl's law. Computer taxonomies. Memory organization, Princeton/Harvard architectures, caches, and virtual memory. Instruction pipelining. Vector processing. Instruction sets (RISC/CISC/VLIW). Parallel processing (SIMD/MIMD). Multiprocessor interconnection networks, communications, and synchronization. (.50 ED / .50 ES) Prerequisite: Computer Science 104 or Electrical Engineering 152. One course. *Board or Dollas*

253. Parallel System Performance. Intrinsic limitations to computer performance. Amdahl's Law and its extensions. Components of computer architecture and operating systems, and their impact on the performance available to applications. Intrinsic properties of application programs and their relation to performance. Task graph models of parallel programs. Estimation of best possible execution times. Task assignment and related heuristics. Load balancing. Specific examples from computationally intensive, I/O intensive, and mixed parallel and distributed computations. Global distributed system performance. (.60 ED / .40 ES) Prerequisites: Computer Science 110; Electrical Engineering 151 and 152. One course. *Gelenbe*

254. Fault-Tolerant and Testable Computer Systems. Faults and failure mechanisms, test generation techniques and diagnostic program development for detection and location of faults in digital networks; design for testability, redundancy techniques, self-checking and fail-safe networks, fault-tolerant computer architectures. (.50 ED / .50 ES) Prerequisite: Electrical Engineering 151 or equivalent. C-L: Computer Science 225. One course. *Marinos*

255. Mathematical Methods for Systems Analysis I. Basic concepts and techniques used in the stochastic modeling of systems. Elements of probability, statistics, queuing theory, and simulation. (.25 ED / .75 ES) Prerequisite: four semesters of college mathematics. C-L: Computer Science 226. One course. *Trivedi*

257. Performance and Reliability of Computer Networks. Methods for performance and reliability analysis of local area networks as well as wide area networks.

Probabilistic analysis using Markov models, stochastic Petri nets, queuing networks, and hierarchical models. Statistical analysis of measured data and optimization of network structures. (.25 ED / .75 ES) Prerequisites: Electrical Engineering 156 and 255. One course. *Trivedi*

258. Artificial Neural Networks. Elementary biophysical background for signal propagation in natural neural systems. Artificial neural networks (ANN) and the history of computing; early work of McCulloch and Pitts, of Kleene, of von Neumann and others. The McCulloch and Pitts model. The connectionist model. The random neural network model. ANN as universal computing machines. Associative memory; learning; algorithmic aspects of learning. Complexity limitations. Applications to pattern recognition, image processing and combinatorial optimization. (.60 ED / .40 ES) Prerequisite: Electrical Engineering 151. One course. *Gelenbe*

261. Full Custom VLSI Design. A first course in VLSI design with CMOS technologies. A study of devices, circuits, fabrication technology, logic design techniques, subsystem design and system architecture. Modeling of circuits and subsystems. Testing of gates, subsystems and chips, and design for testability. The fundamentals of full-custom design, and some semi-custom design. (.75 ED / .25 ES) Prerequisite: Electrical Engineering 151 or equivalent; Electrical Engineering 163L or equivalent. One course. *Dollas or Overhauser*

262. Advanced VLSI Design and Test. An advanced course in VLSI design with emphasis on the design of application specific IC's (ASIC) for a given set of specifications. Discussions of available technologies for ASIC implementation and tradeoffs in using these technologies. Static and dynamic CMOS design of commonly used circuits (adders, multipliers, RAM, pads). Packaging and testing of ASIC's with emphasis on functional and performance verification. This course stresses the design of ASIC's within a systems design environment and with the use of appropriate design tools that can be used to validate a design based on a given set of design specifications. (.75 ED / .25 ES) Prerequisite: Electrical Engineering 261. One course. *Dollas or Kanopoulos*

266. VLSI Design Verification Techniques. VLSI verification tool design. Design and capabilities of circuit simulation, timing simulation, logic simulation, and functional simulation. Techniques applied in timing verification and other static verification tools. Parallel processing and its application to simulation. Physical design issues related to verification. (.75 ED / .25 ES) Prerequisite: Electrical Engineering 261, working knowledge of C. One course. *Overhauser*

269. VLSI Chip Testing. Introduction to VLSI chip and system testing. Testing theory, strategies, and fault identification. Hands-on testing experience with faulty chips and systems, chips designed in Electrical Engineering 261, and testing equipment available in the department. (.5 ED / .5 ES) Prerequisite: Electrical Engineering 261. One course. *Overhauser*

271. Electromagnetic Theory. The classical theory of Maxwell's equations; electrostatics, magnetostatics, boundary value problems including numerical solutions, currents and their interactions, and force and energy relations. Three class sessions. Consent of instructor required. (.50 ED / .50 ES) One course. *Joines*

272. Electromagnetic Communication Systems. Review of fundamental laws of Maxwell, Gauss, Ampere, and Faraday. Elements of waveguide propagation and antenna radiation. Analysis of antenna arrays by images. Determination of gain, loss, and noise temperature parameters for terrestrial and satellite electromagnetic communication systems. (.5 ED / .5 ES) Prerequisite: Electrical Engineering 170 or 271. One course. *Joines*

273. Optical Communication Systems. Mathematical methods, physical ideas, and device concepts of optoelectronics. Maxwell's equations, and definitions of energy density and power flow. Transmission and reflection of plane waves at interfaces. Optical resonators, waveguides, fibers, and detectors are also presented. (.50 ED / .50 ES) Prerequisite: Electrical Engineering 170 or equivalent. One course. *Joines*

274. Modern Optics. Optical processes including the propagation of light, coherence, interference, and diffraction. Consideration of the optical properties of solids with applications of these concepts to lasers and modern optical devices. (.25 ED / .75 ES) C-L: Physics 185. One course. *Guenther*

275. Microwave Electronic Circuits. Microwave circuit analysis and design techniques. Properties of planar transmission lines for integrated circuits. Matrix and computer-aided methods for analysis and design of circuit components. Analysis and design of input, output, and interstage networks for microwave transistor amplifiers and oscillators. Topics on stability, noise, and signal distortion. (.75 ED / .25 ES) Prerequisite: Electrical Engineering 170 or equivalent. One course. *Joines*

281. Random Signals and Noise. Introduction to mathematical methods of describing and analyzing random signals and noise. Review of basic probability theory; joint, conditional, and marginal distributions; random processes. Time and ensemble averages, correlation, and power spectra. Optimum linear smoothing and predicting filters. Introduction to optimum signal detection and parameter estimation. (1.0 ES) Prerequisite: Mathematics 135 or Statistics 113. One course. *Hansen*

282. Digital Signal Processing. Introduction to the fundamentals of processing signals by digital techniques with applications to practical problems. Discrete time signals and systems, elements of the Z-transform, discrete Fourier transforms, digital filter design techniques, fast Fourier transforms, and discrete random signals. (.50 ED / .50 ES) One course. *Nolte*

283. Digital Communication Systems. Digital modulation techniques. Coding theory. Transmission over bandwidth constrained channels. Signal fading and multipath effects. Spread spectrum. Optical transmission techniques. (.50 ED / .50 ES) Prerequisite: Electrical Engineering 281 or consent of instructor. One course. *Bottomley*

285. Signal Detection and Extraction Theory. Introduction to signal detection and information extraction theory from a statistical decision theory viewpoint. Subject areas covered within the context of a digital environment are decision theory, detection and estimation of known and random signals in noise, estimation of parameters and adaptive recursive digital filtering, and decision processes with finite memory. Applications to problems in communication theory. (.50 ED / .50 ES) Prerequisite: Electrical Engineering 281 or consent of instructor. One course. *Nolte*

286. Digital Processing of Speech Signals. Detailed treatment of the theory and application of digital speech processing. Modeling of the speech production system and speech signals; speech processing methods; digital techniques applied in speech transmission, speech synthesis, speech recognition, and speaker verification. Acoustic-phonetics, digital speech modeling techniques, LPC analysis methods, speech coding techniques. Application case studies: synthesis, vocoders, DTW (dynamic time warping)/HMM (hidden Markov modeling) recognition methods, speaker verification/identification. (.25 ED / .75 ES) Prerequisite: Electrical Engineering 182 or equivalent or consent of instructor. One course. *Hansen*

287. Underwater Communications. Elements of communication theory and digital signal processing are combined with basic physics and oceanography to offer an overview of underwater communications, with an emphasis on the radar/sonar problem. Beamforming with transducer arrays. Signal design and target resolution; the

ambiguity function. The ocean as a communication channel: sound propagation and ambient noise characteristics. Performance analysis of selected communication scenarios and case studies of operational sonar systems. (.50 ED / .50 ES) Prerequisite: Electrical Engineering 181 or consent of instructor. One course. *Alexandrou*

288. Image and Array Signal Processing. Multidimensional digital signal processing with applications to practical problems in image and sensor array processing. Two-dimensional discrete signals and systems, discrete random fields, 2-D sampling theory, 2-D transforms, image enhancement, image filtering and restoration, space-time signals, beamforming, and inverse problems. (.5 ED / .5 ES) Prerequisite: Electrical Engineering 282 or consent of instructor. One course. *Krolik*

299. Advanced Topics in Electrical Engineering. Opportunity for study of advanced subjects related to programs within the electrical engineering department tailored to fit the requirements of a small group. Consent of director of undergraduate studies and of supervising instructor required. One course. *Staff*

THE MAJOR

The major requirements are included in the minimum total of 34 courses listed under the general requirements and departmental requirements. The electrical engineering department requires the equivalent of 4.25 engineering design and 8.50 engineering science courses. This engineering design requirement must include a course which is more than 0.5 ED and must be taken in the junior or senior year of the program. This course must have as a prerequisite at least one course in the discipline.

Mechanical Engineering and Materials Science (ME)

Professor Hochmuth, *Chair*; Assistant Professor Buzzard, *Director of Undergraduate Studies*; Professors Bejan, Cocks, Dowell, Garg, Gösele, Harman, Pearsall, Shaughnessy, and Tan; Associate Professors Bliss, Jones, Knight, Needham, Quinlan, and Wright; Assistant Professors Chen, Clark, Eom, Hall, Howle, Thompson, and Virgin; Assistant Research Professors Bayly, Nagchaudhuri, and Ting-Beall; Adjunct Professor Lee; Adjunct Associate Professors Cherry, Crowson, Jenkins, Tran-Son-Tay, and Wu

A mechanical engineering major is available in this department.

Traditionally it was the mechanical engineer who designed the machinery that powered the factories and that manufactured and transported the goods that made possible the Industrial Revolution. The engines, turbines, rolling mills, forges, presses, machine tools, and manufacturing machinery required by this revolutionary period of mankind gave birth to the mechanical engineering profession. The modern mechanical engineer enjoys a very broad involvement within industry and may be found within almost all areas of our present technological society. Design of power plants and machinery remains at the heart of mechanical engineering but will today embody such modern concepts as robotics and computer or microprocessor controlled automation. The involvement of the mechanical engineer may run the entire spectrum from highly sophisticated analysis to the day-to-day problems of maintaining a manufacturing facility.

Technical sales is an area that many mechanical engineers find appealing and where they find themselves in great demand. Many mechanical engineers will use their technical background as a basis for further professional studies leading to such areas as patent law and industrial management. The search for solutions to society's problems requires the engineer to interact with other professions and disciplines, to reach out for an understanding of the economic, social, and political consequences of engineering decisions. Elective opportunities in the social sciences, life sciences, and humanities help to fill this need.

The department has well equipped undergraduate and research laboratories along with a distinguished faculty committed to excellence in undergraduate instruction. Areas of faculty expertise include thermodynamics, heat transfer, fluid mechanics, aerodynamics, acoustics, computational fluid mechanics and heat transfer, control, robotics, expert systems, failure analysis, safe product design, biological fluid mechanics, biorheology, physical metallurgy, mechanical metallurgy, polymers, corrosion, electronic materials, and high temperature semiconductors. Independent study and the graduation with distinction programs allow qualified undergraduates to participate in the research programs of the department. In addition to a major in mechanical engineering, the department offers the opportunity for extensive study in the area of materials science.

11, 12. Undergraduate Research in Mechanical Engineering. An elective program in which undergraduate students participate in an ongoing program of research with mechanical engineering faculty members. The research topic pursued by the student is arranged by mutual agreement between the student and the participating faculty member. For freshmen only. Quarter course each. *Staff*

101L. Thermodynamics. The principal laws of thermodynamics for open and closed systems and their application in engineering. Properties of the pure substance, relationships among properties, mixtures and reactions. Power and refrigeration cycle analysis. (1.0 ES) Prerequisite: Physics 52L. One course. *Harman, Hochmuth, or Thompson*

115L. Failure Analysis and Prevention. A study and analysis of the causes of failure in engineering materials and the diagnosis of those causes. Elimination of failures through proper material selection, treatment, and use. Case histories. Examination of fracture surfaces. Laboratory investigations of different failure mechanisms. (.5 ED / .5 ES) Prerequisites: Engineering 75L and 83L or consent of instructor. One course. *Cocks, Jones, or Pearsall*

120L. Engineering Instrumentation and Measurements. Analysis, design, and application of instrumentation. Error analysis and propagation. Experimental laboratory with PC based measurement and data acquisition, analysis, and graphic display. (.25 ED / .75 ES) Corequisite: Mechanical Engineering 130L. One course. *Buzzard*

126L. Fluid Mechanics. An introductory course emphasizing the application of the principles of conservation of mass, momentum, and energy to a fluid system. Physical properties of fluids, dimensional analysis and similitude, viscous effects and integral boundary layer theory, subsonic and supersonic flows, normal shock waves. Selected laboratory work. (.25 ED / .75 ES) Corequisites: Engineering 123L and Mechanical Engineering 101L. One course. *Hall, Hochmuth, Knight, or Shaughnessy*

130L. Modeling and Analysis of Dynamic Systems. Mathematical modeling of mechanical, electrical, fluid, and thermal systems. Emphasis is placed on a universal approach to system analysis. Topics include: state variables, linearization methods, transfer functions and block diagrams, and feedback techniques for the control of dynamic systems. (.25 ED / .75 ES) Prerequisites: Mathematics 103 and Physics 51L. One course. *R. Clark, Garg, Nagchaudhuri, Virgin, or Wright*

141L. Mechanical Design. A study of practical aspects of mechanical design including conceptualization, specifications, and selection of mechanical elements. The design and application of mechanical components such as gears, cams, bearings, springs, and shafts. Practice in application of the design process through design projects. (1.0 ED) Prerequisite: Mechanical Engineering 115L. One course. *Wright*

150L. Heat and Mass Transfer. A rigorous development of the laws of mass and energy transport as applied to a continuum. Energy transfer by conduction, convection, and radiation. Free and forced convection across boundary layers. Application to heat

exchangers. Selected laboratory work. (.25 ED/.75 ES) Prerequisites: Mathematics 111 and Mechanical Engineering 126L. One course. *Chen or Knight*

160L. Mechanical Systems Design. An integrative design course addressing both creative and practical aspects of the design of systems. Development of the creative design process, including problem formulation and needs analysis, feasibility, legal, economic and human factors, aesthetics, safety, synthesis of alternatives, and design optimization. Application of design methods through several projects including a term design project. (1.0 ED) Prerequisites: Mechanical Engineering 141L and 150L. One course. *Staff*

165. Special Topics in Mechanical Engineering. Study arranged on a special engineering topic in which the faculty has particular interest and competence as a result of research and professional activities. Consent of instructor and director of undergraduate studies required. Half course or one course each. Variable credit. *Staff*

183. Power Generation. Basic concepts of thermodynamics, heat transfer, and fluid flow applied to power generation processes. Nuclear reaction theory and reactor technology; fossil fuel combustion theory and modern boiler practice. Power plant ancillary equipment and processes. Design considerations and analyses include economic and environmental factors. (.5 ED/.5 ES) One course. *Harman*

198. Projects in Mechanical Engineering. Individual projects arranged in consultation with a faculty member. Open only to seniors enrolled in the graduation with distinction program or showing special aptitude for research. Half course to two courses. Prerequisites: *B* average and consent of the director of undergraduate studies. Variable credit. *Staff*

202. Engineering Thermodynamics. Axiomatic formulations of the first and second laws. General thermodynamic relationships and properties of real substances. Energy, availability, and second law analysis of energy conversion processes. Reaction and multiphase equilibrium. Power generation. Low temperature refrigeration and the third law of thermodynamics. Thermodynamic design. (.3 ED/.7 ES) One course. *Bejan*

207. Transport Phenomena in Biological Systems. (.25 ED/.75 ES) See C-L: Biomedical Engineering 207; also C-L: Civil Engineering 207. One course. *Truskey*

208. Introduction to Colloid and Surface Science. This course divides naturally into three sections. The colloid state: classification of colloids and the theoretical frameworks and experimental techniques involved in their characterization. Interfaces: surface tension and free energy; curved interfaces; adhesion, cohesion and wetting; surface activity; catalytic and mechanical properties of solid surfaces. Inter-Surface Forces: the balance of attractive and repulsive forces which operate between colloidal particles and at macroscopic surfaces. Some emphasis on natural and artificial biomembranes. Consent of instructor required. (1.0 ES) One course. *Needham*

210. Intermediate Dynamics. Comprehensive treatment of space kinematics, kinetics of particles and rigid bodies, generalized coordinates, and Lagrange's equations. Introduction to nonlinear and random dynamic analysis of flexible, continuous systems and stability. (.25 ED/.75 ES) C-L: Civil Engineering 210. One course. *Knight or Virgin*

211. Theoretical and Applied Polymer Science. An advanced course in materials science and engineering dealing specifically with the structure and properties of polymers. Particular attention paid to recent developments in the processing and use of modern plastics and fibers. Product design considered in terms of polymer structures, processing techniques, and properties. (.6 ED/.4 ES) C-L: Biomedical Engineering 208. One course. *H. Clark*

212. Electronic Materials. An advanced course in materials science and engineering dealing with the various materials important for solid-state electronics including semiconductors, ceramics, and polymers. Emphasis on thermodynamic concepts and on defects in these materials. Materials preparation and modification methods for technological applications. (.25 ED/.75 ES) Prerequisite: Engineering 83L. One course. *Tan*

214. Corrosion and Corrosion Control. Environmental aspects of the design and utilization of modern engineering alloys. Theory and mechanisms of corrosion, particularly in seawater and atmospheric environments. Microstructural aspects of diffusion, oxidation, hot corrosion, and stress corrosion. (.5 ED/.5 ES) Prerequisite: Engineering 83L. One course. *Jones*

215. Biomedical Materials and Artificial Organs. (.5 ED/.5 ES) Prerequisite: Biomedical Engineering 83L, Engineering 83L or Chemistry 151L or consent of instructor. See C-L: Biomedical Engineering 215. One course. *H. Clark or Reichert*

216. Mechanical Metallurgy. An advanced materials science course dealing with the response of materials to applied forces. Mechanical fundamentals; stress-strain relationships for elastic behavior; theory of plasticity. Metallurgical fundamentals; plastic deformation, dislocation theory; strengthening mechanisms. Mechanical behavior of polymers. Applications to materials testing. (.25 ED/.75 ES) Prerequisites: Engineering 75L and Engineering 083L. One course. *Jones*

217. Fracture of Engineering Materials. Conventional design concepts and their relationship to the occurrence of fracture. Linear elastic and general yield fracture mechanics. Microscopic plastic deformation and crack propagation. The relationship between macroscopic and microscopic aspects of fracture. Time dependent fracture. Fracture of specific materials. (.7 ED/.3 ES) Prerequisites: Engineering 83L and Mechanical Engineering 115L. One course. *Jones*

218. Thermodynamics of Electronic Materials. Basic thermodynamic concepts applied to solid state materials with emphasis on technologically relevant electronic materials such as silicon and GaAs. Thermodynamic functions, phase diagrams, solubilities and thermal equilibrium concentrations of point defects; nonequilibrium processes and the kinetic phenomena of diffusion, precipitation, and growth. (.25 ED/.75 ES) One course. *Tan*

221. Compressible Fluid Flow. Basic concepts of the flow of gases from the subsonic to the hypersonic regime. One-dimensional wave motion, the acoustic equations, and waves of finite amplitude. Effects of area change, friction, heat transfer, and shock on one-dimensional flow. Moving and oblique shock waves and Prandtl-Meyer expansion. (.25 ED/.75 ES) One course. *Shaughnessy*

225. Mechanics of Viscous Fluids. Equations of motion for a viscous fluid, general properties and selected solutions of the Navier-Stokes equations, the Stokes equations, laminar boundary layer equations with selected solutions and approximation techniques, origin of turbulence. (1.0 ES) One course. *Hochmuth*

226. Intermediate Fluid Mechanics. A survey of the principal concepts and equations of fluid mechanics, fluid statics, surface tension, the Eulerian and Lagrangian description, kinematics, Reynolds transport theorem, the differential and integral equations of motion, constitutive equations for a Newtonian fluid, the Navier-Stokes equations, and boundary conditions on velocity and stress at material interfaces. (1.0 ES) One course. *Shaughnessy or Thompson*

227. Advanced Fluid Mechanics. Flow of a uniform incompressible viscous fluid. Exact solutions to the Navier-Stokes equation. Similarity methods. Irrotational flow

theory and its applications. Elements of boundary layer theory. (1.0 ES) Prerequisite: Mechanical Engineering 226 or consent of instructor. One course. *Shaughnessy*

228. Lubrication. Derivation and application of the basic governing equations for lubrication; the Reynolds equation and energy equation for thin films. Analytical and computational solutions to the governing equations. Analysis and design of hydrostatic and hydrodynamic slider bearings and journal bearings. Introduction to the effects of fluid inertia and compressibility. Dynamic characteristics of a fluid film and effects of bearing design on dynamics of machinery. (.25 ED/.75 ES) Prerequisites: Mathematics 111 and Mechanical Engineering 126L. One course. *Knight*

229. Computational Fluid Mechanics and Heat Transfer. An exposition of numerical techniques commonly used for the solution of partial differential equations encountered in engineering physics. Finite-difference schemes (which are well-suited for fluid mechanics problems); notions of accuracy, conservation, consistency, stability, and convergence. Recent applications of weighted residuals methods (Galerkin), finite-element methods, and grid generation techniques. Through specific examples, the student is guided to construct and assess the performance of the numerical scheme selected for the particular type of transport equation (parabolic, elliptic, or hyperbolic). (.5 ED/.5 ES) One course. *Howle*

230. Modern Control and Dynamic Systems. Dynamic modeling of complex linear and nonlinear physical systems involving the storage and transfer of matter and energy. Unified treatment of active and passive mechanical, electrical, and fluid systems. State-space formulation of physical systems. Time and frequency-domain representation. Controllability and observability concepts. System response using analytical and computational techniques. Lyapunov method for system stability. Modification of system characteristics using feedback control and compensation. Emphasis on application of techniques to physical systems. (.25 ED/.75 ES) One course. *Garg or Nagchaudhuri*

235. Advanced Mechanical Vibrations. Analytical and experimental procedures applied to the design of machines and systems for adequate vibration control. Determination of eigenvalues and eigenvectors by iteration and computer techniques, transfer matrices applied to lumped and distributed systems, analytical and numerical methods of obtaining the pulse response of plane and three-dimensional multimass systems, convolution and data processing, introduction to random vibration. (.25 ED/.75 ES) One course. *Knight or Wright*

236. Engineering Acoustics. Fundamentals of acoustics including sound generation, propagation, reflection, absorption, and scattering. Emphasis on basic principles and analytical methods in the description of wave motion and the characterization of sound fields. Applications including topics from noise control, sound reproduction, architectural acoustics, and aerodynamic noise. Occasional classroom or laboratory demonstration. (.25 ED/.75 ES) Prerequisites: Engineering 123L and Mathematics 111 or consent of instructor. One course. *Bliss*

237. Aerodynamics. Fundamentals of aerodynamics applied to wings and bodies in subsonic and supersonic flow. Basic principles of fluid mechanics and analytical methods for aerodynamic analysis. Two- and three-dimensional wing theory, slender-body theory, lifting surface methods, vortex and wave drag. Brief introduction to vehicle design, performance, and dynamics. Special topics such as unsteady aerodynamics, vortex wake behavior, and propeller and rotor aerodynamics. (.25 ED/.75 ES) One course. *Bliss*

238. Advanced Aerodynamics. Advanced topics in aerodynamics. Conformal transformation techniques. Three-dimensional wing theory, optimal span loading for planar and nonplanar wings. Ground effect and tunnel corrections. Propeller theory.

Slender wing theory and slender body theory, transonic and supersonic area rules for minimization of wave drag. Numerical methods in aerodynamics including source panel and vortex lattice methods. (1.0 ES) Prerequisite: Mechanical Engineering 237. One course. *Hall*

239. Unsteady Aerodynamics. Analytical and numerical methods for computing the unsteady aerodynamic behavior of airfoils and wings. Small disturbance approximation to the full potential equation. Unsteady vortex dynamics. Kelvin impulse and apparent mass concepts applied to unsteady flows. Two-dimensional unsteady thin airfoil theory. Time domain and frequency domain analyses of unsteady flows. Three-dimensional unsteady wing theory. Introduction to unsteady aerodynamic behavior of turbomachinery. (1.0 ES) Prerequisite: Mechanical Engineering 237. One course. *Hall*

240. Patent Technology and Law. The use of patents as a technological data base is emphasized including information retrieval in selected engineering disciplines. Fundamentals of patent law and patent office procedures. Consent of instructor required. (.6 ED/.4 ES) C-L: Law 358. One course. *Cocks*

245. Applications in Expert Systems. A comprehensive introduction to the key practical principles, techniques, and tools being used to implement knowledge-based systems. The classic MYCIN system studied in detail to provide historic perspective. Current systems employing combinations of production rules, prototypical knowledge, and frame-based case studies. Student term projects consist of the development of individual, unique expert systems using the Texas Instruments Personal Consultant. Knowledge of LISP not a prerequisite. (.5 ED/.5 ES) One course. *Wright*

252. Buckling of Engineering Structures. (.25 ED/.75 ES) Prerequisite: Civil Engineering 131L or consent of instructor. See C-L: Civil Engineering 252. One course. *Biswas or Virgin*

265. Advanced Topics in Mechanical Engineering. Opportunity for study of advanced subjects related to programs within mechanical engineering tailored to fit the requirements of a small group. Approval of director of undergraduate or graduate studies required. Variable credit. *Staff*

268. Cellular and Biosurface Engineering. A combination of fundamental concepts in materials science, colloids, and interfaces that form a basis for characterizing: the physical properties of biopolymers, microparticles, artificial membranes, biological membranes, and cells; and the interactions of these materials at biofluid interfaces. Definition of the subject as a coherent discipline and application of its fundamental concepts to biology, medicine, and biotechnology. (1.0 ES) Prerequisite: Mechanical Engineering 208 or consent of instructor. One course. *Needham*

270. Robot Control and Automation. Review of kinematics and dynamics of robotic devices; mechanical considerations in design of automated systems and processes, hydraulic and pneumatic control of components and circuits; stability analysis of robots involving nonlinearities; robotic sensors and interfacing; flexible manufacturing; man-machine interaction and safety consideration. (.5 ED/.5 ES) Prerequisites: Mechanical Engineering 230 or equivalent and consent of instructor. One course. *Garg*

277. Optimization Methods for Mechanical Design. Definition of optimal design. Methodology of constructing quantitative mathematical models. Nonlinear programming methods for finding "best" combination of design variables: minimizing steps, gradient methods, flexible tolerance techniques for unconstrained and constrained problems. Emphasis on computer applications and term projects. Consent of instructor required. (.5 ED/.5 ES) One course. *Wright*

280. Convective Heat Transfer. Models and equations for fluid motion, the general energy equation, and transport properties. Exact, approximate, and boundary layer solutions for laminar flow heat transfer problems. Use of the principle of similarity and analogy in the solution of turbulent flow heat transfer. Two-phase flow, nucleation, boiling, and condensation heat and mass transfer. (1.0 ES) One course. *Bejan*

281. Conduction and Radiation. Conduction heat transfer in the steady and transient state, in rectangular, cylindrical, and spherical coordinates. Melting and solidification. Radiation exchange involving absorbing and emitting media including gases and flames, combined conduction and radiation, and combined convection and radiation. Exact and approximate methods of solution including separation of variables, transform calculus, numerical procedures, and integral and variational methods. (1.0 ES) One course. *Bejan*

290. Physical Oceanography. Introduction to the dynamic principles of ocean circulation with an emphasis on large temporal and spatial scales of motion. Topics include wind-driven and density-driven flow, western boundary intensification, mid-ocean, shelf, and tropical circulations. (1.0 ES) Corequisite: Geology 250. Prerequisites: Mathematics 31 and 32 or consent of instructor. C-L: Environment 290, Geology 203, and Marine Sciences. One course. *Lozier*

COURSES CURRENTLY UNSCHEDULED

102. Thermodynamics II

113. Introduction to Electronic Materials

224. An Introduction to Turbulence

THE MAJOR

The major requirements are included in the minimum total of thirty-four courses listed under the general requirements and departmental requirements. Specific courses which must be included are Engineering 75L, 83L, and 123L; Mechanical Engineering 101L, 115L, 120L, 126L, 130L, 141L, 150L, and 160L.

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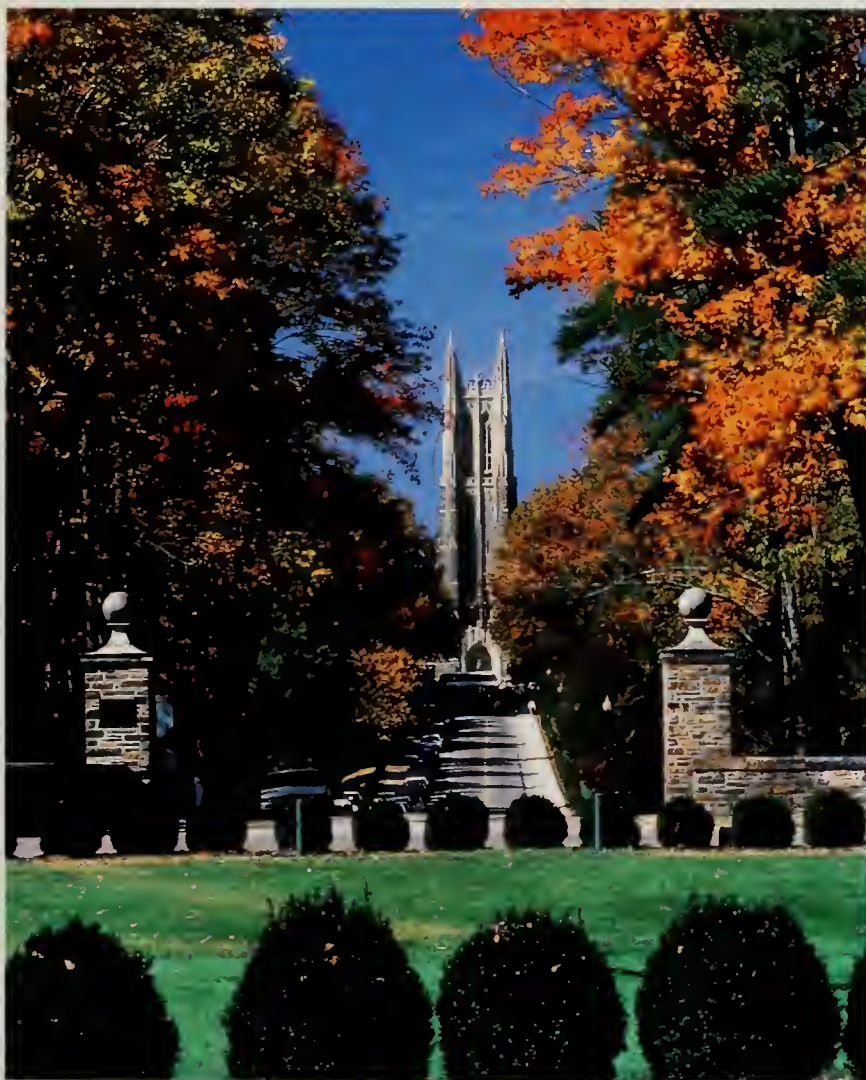
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The Bulletin of Duke University, Volume 66, includes the following titles: The Fuqua School of Business; The School of the Environment; Undergraduate Instruction; The Graduate School; The Medical Center; The Divinity School; Information for Prospective Students; Information for Graduate Students; Summer Session; Graduate Program in Nursing; The School of Law; and Information and Regulations.

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Calendar of the Graduate School*

Summer 1994†

- May**
12 Thursday—Summer Session Term I classes begin.
- June**
23 Wednesday—Summer Session Term I final examinations begin.
24 Thursday—Summer Session Term I final examinations end.
27 Monday—Summer Session Term II classes begin.
- July**
27 Final date to submit master's theses and Ph.D. dissertations for a September degree.
- August**
5 Friday—Summer Session Term II final examinations begin.
5 Final date for completing degree requirements for an advanced degree to be dated September 1994.
6 Saturday—Term II final examinations end.
18-27 Oral proficiency interviews for all incoming students whose native language is not English. Details available through International House.

Fall 1994

- August**
27 Saturday—English examination required for all incoming students whose native language is not English. Examination will begin in Room 139, Social Sciences Building, at 10:00 a.m.
26 Friday—Graduate and Professional School Opening Convocation, 5:00 p.m., Duke Chapel.
29 Monday—Fall semester classes begin at 8:00 a.m.
- September**
9 Friday—Last day for drop/add. No late registrations will be taken after this date.
- October**
14 Friday—Fall break begins at 6:00 p.m.
19 Wednesday—Classes resume at 8:00 a.m.
- November**
1 Tuesday—Last day for completion of applications to the spring 1995 semester.
23 Wednesday—Thanksgiving recess begins at 12:30 p.m.
28 Monday—Classes resume at 8:00 a.m.
- December**
1 Thursday—Final date for filing with the Graduate School the intention to receive an advanced degree in December.
1 Thursday—Deadline for applications eligible to pay reduced application fee (see application materials), fall 1995.

*The dates in this calendar are subject to change. Information on registration dates is available from the Office of the University Registrar.

†The School of the Environment, the Fuqua School of Business, the Marine Laboratory, and the Department of Physical Therapy have different term lengths and/or starting dates during the summer; consult the appropriate bulletins and schedules.

December (cont.)

- 2 Friday—Graduate classes end at 6:00 p.m.
- 7 Wednesday—Final date to submit master's theses and Ph.D. dissertations.
- 3-11 Saturday-Sunday—Graduate reading period; length of 200-level course reading period is determined by the instructor.
- 11 Sunday—Founders' Day.
- 12 Monday—Final examinations begin.
- 16 Friday—Final date for completing degree requirements for an advanced degree to be awarded December 1993. All final copies of examined and signed theses and dissertations must be returned to 013 Perkins Library by this date.
- 17 Saturday—Final examinations end.
- 31 Saturday—Postmark deadline for applications to all programs (see application materials), fall 1995.

Spring 1995

January

- 8 Saturday—English language proficiency examination for all incoming students whose native language is not English from 10:00 a.m.-12:00 noon in Room 317 Allen Building.
- 12 Thursday—Spring semester classes begin at 9:00 a.m.
- 25 Wednesday—Final day for drop/add. No late registrations will be allowed after January 19.

February

- 1 Wednesday—Final date for filing with the Graduate School office the intention to receive an advanced degree in May.

March

- 4 Friday—Spring recess begins at 6:00 p.m.
- 14 Monday—Classes resume at 8:00 a.m.

April

- 3 Monday—Final date for submitting dissertation for the Ph.D. degree.
- 17 Monday—Final date for submitting theses for master's degrees.
- 21 Friday—Graduate classes end at 6:00 p.m.
- 22-30 Saturday-Sunday—Graduate reading period; length of 200-level course reading period is determined by the instructor.
- 28 Friday—Final day for completing degree requirements for an advanced degree to be awarded in May 1995. All final copies of examined and signed theses and dissertations must be returned to 013 Perkins by this date.

May

- 1 Monday—Final examinations begin.
- 6 Friday—Final examinations end.
- 12 Friday—Commencement begins.
- 14 Sunday—Graduation exercises. Conferring of degrees.

University Administration

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John Richards
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Robert Webster

Graduate School Faculty

*(As of January 1, 1994.)
The date denotes the first year of service at Duke University.*

Mohamed Bahie Abou-Donia (1975), Ph.D., *Professor of Pharmacology and Professor of Neurobiology*
Dolph O. Adams (1972), M.D., Ph.D., *Professor of Pathology and Associate Professor of Immunology*
Pankaj K. Agarwal (1990), Ph.D., *Associate Professor of Computer Science*
Peter Aitken (1988), Ph.D., *Associate Medical Professor of Cell Biology*
John H. Aldrich (1987), Ph.D., *Professor of Political Science*
Dimitri Alexandrou (1987), Ph.D., *Associate Professor of Electrical Engineering*
William K. Allard (1975), Ph.D., *Professor of Mathematics*

Anne Allison (1992), Ph.D., Assistant Professor of Cultural Anthropology
 A. Tito Alt (1961-65; 1967), Ph.D., Professor of Germanic Languages and Literature
 Nels C. Anderson (1966), Ph.D., Associate Professor of Cell Biology
 Norman B. Anderson (1985), Ph.D., Associate Professor of Psychology: Social and Health Sciences
 Page A. W. Anderson (1973), M.D., Assistant Professor of Cell Biology
 Edna Andrews (1984), Ph.D., Associate Professor of Slavic Languages and Literatures
 Robert Anholt (1986), Ph.D., Assistant Professor of Neurobiology
 James J. Anton (1989), Ph.D. Associate Professor of Business Administration
 Janis Antonovics (1970), Ph.D., James J. Wolfe Professor of Botany
 James W. Applewhite (1971), Ph.D., Professor of English
 Mahadev L. Apte (1965), Ph.D., Professor of Cultural Anthropology
 Ronald Paul Archer (1990), Ph.D., Assistant Professor of Political Science
 Yair Argon (1984), Ph.D., Assistant Professor of Immunology and Assistant Professor of Cell Biology
 William Louis Ascher (1984), Ph.D., Professor of Public Policy Studies and Professor of Political Science
 Alison Hubbard Ashton (1986), Ph.D., Associate Professor of Business Administration
 Robert H. Ashton (1986), Ph.D. T. Austin Finch, Sr., Professor of Business Administration
 George J. Augustine (1991), Ph.D., Associate Professor of Neurobiology
 Lloyd Richard Bailey (1971), Ph.D., Professor of Religion, Old Testament
 Paul A. Baker (1981), Ph.D., Associate Professor of Geology
 Andrew E. Balber (1985), Ph.D., Associate Medical Research Professor of Immunology
 Bruce Baldwin (1992), Ph.D., Assistant Professor of Botany
 Steven W. Baldwin (1978), Ph.D., Professor of Chemistry
 Helmy Hamdollah Baligh (1967), Ph.D., Professor of Business Administration
 Robert H. Ballantyne (1962), Ed.D., Associate Professor of Education
 Ravi Bansal (1990), Ph.D., Assistant Professor of Business Administration and Adjunct Assistant Professor of Economics
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 Richard T. Barber (1980), Ph.D., Professor of the Environment
 Roger C. Barr (1969), Ph.D., Professor of Biomedical Engineering
 Elizabeth C. Bartlett (1982), Ph.D., Associate Professor of Music
 Robert Charles Bartlett (1976), M.A., Professor of Physical Therapy
 Jorge Valls Bartolome (1978), Ph.D., Associate Medical Research Professor of Pharmacology
 Deepak Bastia (1979), Ph.D., Professor of Microbiology
 James R. Baumgardner (1985), Ph.D., Assistant Professor of Economics
 J. Thomas Beale (1983), Ph.D., Professor of Mathematics
 Hie Ping Beall (1975), Ph.D., Assistant Research Professor of Mechanical Engineering and Materials Science
 Michael Been (1987), Ph.D., Assistant Professor of Biochemistry
 Lorena Beese (1992), Ph.D., Assistant Professor of Biochemistry
 Robert D. Behn (1973), Ph.D., Professor of Public Policy Studies
 Robert Paul Behringer (1982), Ph.D., Professor of Physics, Professor of Computer Science, and Professor of Mechanical Engineering and Materials Science
 Adrian Bejan (1984), Ph.D., J. A. Jones Professor of Mechanical Engineering and Materials Science
 David F. Bell III (1983), Ph.D., Associate Professor of Romance Studies
 Robert M. Bell (1972), Ph.D., Professor of Molecular Cancer Biology and James B. Duke Professor of Biochemistry
 Messod Beneish (1989), Ph.D., Associate Professor of Business Administration
 Bruce A. Benjamin (1989), Ph.D., Assistant Professor of Cell Biology
 Peter Brian Bennett (1972), Ph.D., D.Sc., Professor of Cell Biology
 Vann Bennett (1987), Ph.D., Professor of Biochemistry and Assistant Professor of Cell Biology
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 Darell D. Bigner (1972), M.D., Ph.D., Professor of Pathology
 Sandra H. Bigner (1977), M.D., Professor of Pathology
 Edward George Bilpuch (1962), Ph.D., Professor of Physics
 Mrinmay Biswas (1983), Ph.D., Associate Research Professor of Civil Engineering
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 Kalman P. Bland (1973), Ph.D., Associate Professor of Religion
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Robert T. Freneau, Jr. (1989), Ph.D., *Assistant Professor of Pharmacology and Assistant Professor of Neurobiology*

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Henry S. Friedman (1992), M.D., *Assistant Professor of Pathology*

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Mariano Agustin Garcia-Blanco (1984), M.D., Ph.D., *Assistant Professor of Molecular Cancer Biology and Assistant Professor of Microbiology*

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Devendra P. Garg (1972), Ph.D., *Professor of Mechanical Engineering and Materials Science*

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Raymond Gavins (1970), Ph.D., *Professor of History*

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 John Kress (1992), Ph.D., *Adjunct Associate Professor of Botany*
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 Thomas J. McManus (1961), M.D., *Professor of Cell Biology*
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 Kenneth Surin (1987), Ph.D., *Professor of Religion and Professor of Literature*
 Richard S. Surwit (1977), Ph.D., *Professor of Psychology: Social and Health Sciences*
 James A. Swenberg (1979), D.V.M., Ph.D., *Adjunct Associate Professor of Pathology*
 Tibor Szász (1990), D.M.A., *Associate Professor of the Practice of Music*
 Teh Y. Tan (1986), Ph.D., *Professor of Mechanical Engineering and Materials Science*

George E. Tauchen (1977), Ph.D., *Professor of Economics*
 Kenneth Allen Taylor (1980), Ph.D., *Associate Medical Research Professor of Cell Biology*
 Thomas F. Tedder (1993), *Professor of Immunology*
 John J. TePaske (1967), Ph.D., *Professor of History*
 Stephen W. Teitsworth (1988), Ph.D., *Assistant Professor of Physics and Assistant Professor of Electrical Engineering*
 John Terborgh (1989), Ph.D., *James B. Duke Professor of Environmental Science, Professor of Biological Anthropology and Anatomy, and Professor of Zoology*
 Robert A. Terry (1989), *Assistant Professor of the Practice of Psychology: Social and Health Sciences*
 Julie Andresen Tetel (1986), Ph.D., *Andrew W. Mellon Assistant Professor of English and Assistant Professor of Cultural Anthropology*
 Marcel Tetel (1960), Ph.D., *Professor of Romance Studies*
 Jean-Jacques Thomas (1981), *Doctorat de 3e Cycle, Professor of Romance Studies and Professor of Literature*
 John E. Thomas (1987), Ph.D., *Professor of Physics*
 John H. Thompson (1991), Ph.D., *Professor of History*
 Peter A. Thompson (1992), Ph.D., *Assistant Professor of Mechanical Engineering and Materials Science and Assistant Professor of Physics*
 Susan Thorne (1991), Ph.D., *Assistant Professor of History*
 Patricia H. Thornton (1993), Ph.D., *Assistant Professor of Sociology*
 Fredrick L. Thurstone (1967), Ph.D., *Research Professor of Biomedical Engineering*
 Edward A. Tiryakian (1965), Ph.D., *Professor of Sociology*
 Margaret A. Titus (1990), Ph.D., *Assistant Professor of Cell Biology*
 R. Larry Todd (1978), Ph.D., *Professor of Music*
 Jane Tompkins (1985), Ph.D., *Professor of English*
 Eric J. Toone (1991), Ph.D., *Assistant Professor of Chemistry*
 Marianna Torgovnick (1981), Ph.D., *Professor of English*
 Werner Tornow (1988), Ph.D., *Research Associate Professor of Physics*
 Edward Tower (1974), Ph.D., *Professor of Economics*
 Gregg E. Trahey (1985), Ph.D., *Associate Professor of Biomedical Engineering*
 John A. Trangenstein (1991), Ph.D., *Associate Professor of Mathematics*
 Vladimir G. Trembl (1967), Ph.D., *Professor of Economics*
 Kishor S. Trivedi (1975), Ph.D., *Professor of Electrical Engineering and Professor of Computer Science*
 William Tronzo (1992), Ph.D., *Associate Professor of Art History*
 George Truskey (1987), Ph.D., *Assistant Professor of Biomedical Engineering and Assistant Professor of Biochemical Engineering*
 Vance Tucker (1964), Ph.D., *Professor of Zoology*
 Clare Tufts (1987), Ph.D., *Associate Professor of the Practice of Romance Studies*
 Jerry J. Tulis (1993), Ph.D., *Adjunct Associate Professor of the Environment*
 William Turner (1987), Ph.D., *Assistant Professor of Religion, Theology and Black Church Studies*
 E. Lee Tyrey (1970), Ph.D., *Associate Professor of Neurobiology*
 Bisulay Utku (1987), Ph.D., *Adjunct Associate Professor of Civil Engineering*
 Senol Utku (1970), Sc.D., *Professor of Civil Engineering and Professor of Computer Science*
 Marcy K. Uyenoyama (1982), Ph.D., *Professor of Zoology*
 Antonius M. Van Dongen (1992), Ph.D., *Assistant Professor of Pharmacology*
 Hans J. Van Miegroet (1988), Ph.D., *Assistant Professor of Art History*
 Carel van Schaik (1989), Ph.D., *Associate Professor of Biological Anthropology and Anatomy, Associate Professor of Environment, and Associate Professor of Zoology*
 Stephanos Venakides (1986), Ph.D., *Professor of Mathematics*
 John M. Vernon (1966), Ph.D., *Professor of Economics*
 P. Aarne Vesilind (1970), Ph.D., *Professor of Civil Engineering and Professor of the Environment*
 Steven Vigna (1987), Ph.D., *Associate Professor of Cell Biology*
 Teresa Maria Vilaros (1992), Ph.D., *Assistant Professor of Romance Studies*
 Rytas J. Vilgalys (1986), Ph.D., *Associate Professor of Botany*
 Elia E. Villanueva (1969), A.M., *Associate Professor of Physical Therapy*
 Lawrence N. Virgin (1989), Ph.D., *Assistant Professor of Mechanical Engineering and Materials Science and Assistant Professor of Civil Engineering*
 W. Kip Viscusi (1988), Ph.D., *George G. Allen Professor of Economics*
 S. Viswanathan (1986), Ph.D., *Associate Professor of Business Administration*
 Jeffrey Vitter (1993), Ph.D., *Professor of Computer Science*
 Steven Vogel (1966), Ph.D., *Professor of Zoology*
 Robin T. Vollmer (1975), M.D., *Assistant Clinical Professor of Pathology*
 Olaf T. von Ramm (1974), Ph.D., *Professor of Biomedical Engineering*
 Grant A. Wacker (1992), Ph.D., *Associate Professor of Religion*
 Robert A. Wagner (1978), Ph.D., *Associate Professor of Computer Science*
 Geoffrey Wainwright (1983), Dr.Theol., *Professor of Religion, Systematic Theology*
 Stephen A. Wainwright (1964), Ph.D., *James B. Duke Professor of Zoology*

T. Dudley Wallace (1974), Ph.D., *James B. Duke Professor of Economics*
 Wanda T. Wallace (1990), Ph.D., *Assistant Professor of Business Administration*
 Lise Wallach (1970), Ph.D., *Research Professor of Psychology: Experimental and Research Professor of Psychology: Social and Health Sciences*
 Michael A. Wallach (1962-72; 1973), Ph.D., *Professor of Psychology: Experimental and Professor of Psychology: Social and Health Sciences*
 Richard L. Walter (1962), Ph.D., *Professor of Physics*
 Paul P. Wang (1968), Ph.D., *Professor of Electrical Engineering*
 Xiao-Fan Wang (1992), Ph.D., *Assistant Professor of Pharmacology*
 Calvin L. Ward (1952), Ph.D., *Professor of Zoology*
 Frances Ellen Ward (1969), Ph.D., *Professor of Immunology*
 Seth L. Warner (1955), Ph.D., *Professor of Mathematics*
 Robert E. Webster (1970), Ph.D., *Professor of Biochemistry*
 E. Roy Weintraub (1970), Ph.D., *Professor of Economics*
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 Michael West (1990), Ph.D., *Professor of Statistics and Decision Sciences*
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 Richard A. White (1963), Ph.D., *Professor of Botany*
 Stephen William White (1990), Ph.D., *Associate Professor of Microbiology*
 Richard Whorton (1979), Ph.D., *Associate Professor of Pharmacology*
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 Susan Willis (1989), Ph.D., *Associate Professor of English*
 James F. Wilson (1967), Ph.D., *Professor of Civil Engineering*
 John Wilson (1968), D.Phil., *Professor of Sociology*
 Wilkie Andrew Wilson, Jr. (1974), Ph.D., *Medical Research Professor of Pharmacology*
 Robert L. Winkler (1984), Ph.D., *James B. Duke Professor of Business Administration and Professor of Statistics and Decision Sciences*
 Orval S. Wintermute (1958), Ph.D., *Professor of Religion*
 Ronald G. Witt (1971), Ph.D., *Professor of History*
 Benjamin Wittels (1961), M.D., *Professor of Pathology*
 Myron L. Wolbarsht (1968), Ph.D., *Professor of Ophthalmology in the Department of Psychology and Professor of Biomedical Engineering*
 Robert L. Wolpert (1984), Ph.D., *Associate Professor of Statistics and Decision Sciences and Associate Professor of the Environment*
 Fulton Wong (1989), Ph.D., *Associate Professor of Neurobiology*
 Peter H. Wood (1975), Ph.D., *Professor of History*
 Donald Wright (1967), Ph.D., *Associate Professor of Mechanical Engineering and Materials Science*
 Duncan Yaggy (1980), Ph.D., *Adjunct Professor of Public Policy Studies*
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 Weitao Yang (1989), Ph.D., *Assistant Professor of Chemistry*
 William E. Yarger (1971), M.D., *Assistant Professor of Cell Biology*
 William P. Yohe (1958), Ph.D., *Professor of Economics*
 John G. Younger (1974), Ph.D., *Professor of Classical Archaeology in Classical Studies*
 Michael Rod Zalutsky (1985) Ph.D., *Assistant Professor of Pathology*
 John W. Zarker (1989), Ph.D., *Senior Lecturing Fellow in Classical Studies*
 Fangyang Zheng (1990), Ph.D., *Assistant Professor of Mathematics*
 Xin Zhou (1993), Ph.D., *Associate Professor of Mathematics*
 Peter Zwadyk, Jr. (1971), Ph.D., *Associate Professor of Pathology and Associate Professor of Microbiology*

Professors Emeriti

Irving E. Alexander (1963), Ph.D., *Professor Emeritus of Psychology*
 D. Bernard Amos (1962), M.D., *James B. Duke Professor Emeritus of Immunology*
 Carl L. Anderson (1955), Ph.D., *Professor Emeritus of English*
 Lewis Edward Anderson (1936), Ph.D., *Professor Emeritus of Botany*
 Roger Fabian Anderson (1950), Ph.D., *Professor Emeritus of Entomology*
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 Kurt W. Back (1959), Ph.D., *James B. Duke Professor Emeritus of Sociology*

Joseph Randle Bailey (1946), Ph.D., *Professor Emeritus of Zoology*
 Frank Baker (1960), Ph.D., *Professor Emeritus of English Church History*
 M. Margaret Ball (1963), Ph.D., *Professor Emeritus of Political Science*
 Katharine May Banham (1946), Ph.D., *Associate Professor Emeritus of Psychology*
 William Waldo Beach (1946), Ph.D., *Professor Emeritus of Christian Ethics*
 Mary L. C. Bernheim (1930), Ph.D., *Professor Emeritus of Biochemistry*
 L. C. Biedenharn, Jr. (1961), Ph.D., *James B. Duke Professor Emeritus of Physics*
 William Dwight Billings (1952), Ph.D., *James B. Duke Professor Emeritus of Botany*
 John O. Blackburn (1959), Ph.D., *Professor Emeritus of Economics*
 Cazlyn Green Bookhout (1935), Ph.D., *Professor Emeritus of Zoology*
 Lloyd J. Borstelmann (1953), Ph.D., *Professor Emeritus of Psychology*
 Benjamin Boyce (1950), Ph.D., *James B. Duke Professor Emeritus of English*
 Charles Kilgo Bradsher (1939), Ph.D., *James B. Duke Professor Emeritus of Chemistry*
 Ralph Braibanti (1953), Ph.D., *James B. Duke Professor Emeritus of Political Science*
 Eleanor F. Branch (1953), Ph.D., *Associate Professor Emeritus of Physical Therapy*
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 Earl Ivan Brown II (1960), Ph.D., *J. A. Jones Professor Emeritus of Civil Engineering*
 Louis J. Budd (1952), Ph.D., *James B. Duke Professor Emeritus of English*
 Frances Campbell Brown (1931), Ph.D., *Professor Emeritus of Chemistry*
 Edwin H. Cady (1973), Ph.D., *Andrew W. Mellon Professor Emeritus in the Humanities*
 Leonard Carlitz (1932), Ph.D., *James B. Duke Professor Emeritus of Mathematics*
 William H. Cartwright (1951), Ph.D., *Professor Emeritus of Education*
 Jack B. Chaddock (1966), Sc.D., *Professor Emeritus of Mechanical Engineering and Materials Science*
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 Kalman J. Cohen (1974), Ph.D., *Distinguished Bank Research Professor Emeritus*
 Joel Colton (1947), Ph.D., *Professor Emeritus of History*
 Robert Merle Colver (1953), Ed.D., *Associate Professor Emeritus of Education*
 Thomas Howard Cordle (1950), Ph.D., *Professor Emeritus of Romance Studies*
 Robert E. Cushman (1945), Ph.D., *Research Professor Emeritus of Systematic Theology*
 Bingham Dai (1943), Ph.D., *Professor Emeritus of Psychology*
 David G. Davies (1961), Ph.D., *Professor Emeritus of Economics*
 William D. Davies (1966), D.D., F.B.A., *George Washington Ivey Professor Emeritus of Advanced Studies and Research in Christian Origins*
 Eugene Davis Day (1962), Ph.D., *Professor Emeritus of Immunology*
 Irving T. Diamond (1958), Ph.D., *James B. Duke Professor Emeritus of Psychology*
 Neal Dow (1934), Ph.D., *Professor Emeritus of Romance Languages*
 Francis George Dressel (1929), Ph.D., *Professor Emeritus of Mathematics*
 Kenneth Lindsay Duke (1940), Ph.D., *Associate Professor Emeritus of Biological Anthropology and Anatomy*
 Howard Easley (1930), Ph.D., *Associate Professor Emeritus of Education*
 Ernest Elsevier (1950), M.S., *Associate Professor Emeritus of Mechanical Engineering*
 Henry A. Fairbank (1962), Ph.D., *Professor Emeritus of Physics*
 Arthur Bowles Ferguson (1939), Ph.D., *Professor Emeritus of History*
 Oliver W. Ferguson (1957), Ph.D., *Professor Emeritus of English*
 Donald J. Fluke (1958), Ph.D., *Professor Emeritus of Zoology*
 Wallace Fowley (1964), Ph.D., *James B. Duke Professor Emeritus of Romance Languages*
 John Hope Franklin (1981), Ph.D., *James B. Duke Professor Emeritus of History*
 Ernestine Friedl (1973), Ph.D., *James B. Duke Professor Emeritus of Anthropology*
 William J. Furbish (1954), M.S., *Associate Professor Emeritus of Geology*
 Thomas M. Gallie, Jr. (1954-55; 1956), Ph.D., *Professor Emeritus of Computer Science*
 W. Scott Gehman, Jr. (1954), Ph.D., *Professor Emeritus of Psychology in Education*
 Clarence Gohdes (1930), Ph.D., *James B. Duke Professor Emeritus of English*
 John R. Gregg (1957), Ph.D., *Professor Emeritus of Zoology*
 Samson R. Gross (1960), Ph.D., *Professor Emeritus of Biochemistry*
 Kazimierz Grzybowski (1967), S.J.D., *Professor Emeritus of Political Science*
 Herbert Hacker, Jr. (1965), Ph.D., *Associate Professor Emeritus of Electrical Engineering*
 Hugh Marshall Hall, Jr. (1952), Ph.D., *Professor Emeritus of Political Science*
 John Hamilton Hollowell (1942), Ph.D., *James B. Duke Professor Emeritus of Political Science*
 Jerome S. Harris (1936), M.D., *Professor Emeritus of Biochemistry*
 William S. Heckscher (1966), Ph.D., *Benjamin N. Duke Professor Emeritus of Art*
 Henry Hellmers (1965), Ph.D., *Professor Emeritus of Botany and Professor Emeritus of Forestry*
 Stuart C. Henry (1959), Ph.D., *Professor Emeritus of American Christianity*
 Marcus Edwin Hobbs (1935), Ph.D., *University Distinguished Service Professor Emeritus of Chemistry*
 Irving B. Holley, Jr. (1947), Ph.D., *Professor Emeritus of History*
 Everett H. Hopkins (1961), M.A., LL.D., *Professor Emeritus of Education*
 Alexander Hull (1962), Ph.D., *Associate Professor Emeritus of Romance Studies*
 Wanda S. Hunter (1947), Ph.D., *Associate Professor Emeritus of Zoology*
 Allan S. Hurlburt (1956), Ph.D., *Professor Emeritus of Education*

B. Jon Jaeger (1972), Ph.D., *Professor Emeritus of Health Administration*
 Benjamin A. Jayne (1976), Ph.D., *Professor Emeritus of Forestry*
 Bronislas de Leval Jezierski (1958), Ph.D., *Associate Professor Emeritus of Slavic Languages and Literatures*
 Charles B. Johnson (1956), Ed.D., *Associate Professor Emeritus of Education*
 Terry W. Johnson, Jr. (1954), Ph.D., *Professor Emeritus of Botany*
 Alan C. Kerckhoff (1958), Ph.D., *Professor Emeritus of Sociology*
 Robert B. Kerr (1965), Ph.D., *Professor Emeritus of Electrical Engineering*
 Gregory A. Kimble (1952-68; 1977), Ph.D., *Professor Emeritus of Psychology*
 Paul Jackson Kramer (1931), Ph.D., *James B. Duke Professor Emeritus of Botany*
 Irwin Kremen (1963), Ph.D., *Assistant Professor Emeritus of Psychology*
 Juanita Kreps (1957), Ph.D. *James B. Duke Professor Emeritus of Economics*
 Wladyslaw W. Kulski (1963), Ph.D., LL.D., *James B. Duke Professor Emeritus of Russian Affairs*
 Weston LaBarre (1946), Ph.D., *James B. Duke Professor Emeritus of Anthropology*
 Leon Lack (1965), Ph.D., *Professor Emeritus of Pharmacology*
 Creighton Lacy (1953), Ph.D., *Professor Emeritus of World Christianity*
 Richard H. Leach (1955), Ph.D., *Professor Emeritus of Political Science*
 Harold Walter Lewis (1946), Ph.D., *University Distinguished Service Professor Emeritus of Physics*
 C. Eric Lincoln (1976), Ph.D., *William R. Kenan, Jr. Professor Emeritus of Religion*
 L. Sigfred Linderoth, Jr. (1965), M.E., *Professor Emeritus of Mechanical Engineering*
 Kenneth S. McCarty (1959), Ph.D., *Professor Emeritus of Biochemistry*
 John Nelson Macduff (1956), M.M.E., *Professor Emeritus of Mechanical Engineering*
 Sidney David Markman (1947), Ph.D., *Professor Emeritus of Art History and Professor Emeritus of Archaeology*
 Richard S. Metzgar (1962), Ph.D., *Professor Emeritus of Immunology*
 John W. Moore (1961), Ph.D., *Professor Emeritus of Neurobiology*
 Montrose J. Moses (1959), Ph.D., *Professor Emeritus of Cell Biology*
 Earl George Mueller (1945), Ph.D., *Professor Emeritus of Art*
 Roland E. Murphy (1967-68; 1971), S.T.D., *George Washington Ivey Professor Emeritus of Old Testament*
 Francis Joseph Murray (1960), Ph.D., *Professor Emeritus of Mathematics*
 Aubrey Willard Naylor (1952), Ph.D., *James B. Duke Professor Emeritus of Botany*
 Thomas H. Naylor (1964), Ph.D., *Professor Emeritus of Economics*
 Yasuhiko Nozaki (1966), Ph.D., *Associate Professor Emeritus of Biochemistry*
 Holger O. Nygard (1968), Ph.D., *Professor Emeritus of English*
 James G. Osborne (1961), B.S., *Professor Emeritus of Forest Biometry*
 Suydam Osterhout (1959), M.D., Ph.D., *Professor Emeritus of Microbiology and Immunology*
 Athos Ottolenghi (1959), M.D., *Professor Emeritus of Pharmacology*
 Harry Ashton Owen, Jr. (1951), Ph.D., *Professor Emeritus of Electrical Engineering*
 Erdman B. Palmore (1967), Ph.D., *Professor Emeritus of Sociology*
 Harold Talbot Parker (1939), Ph.D., *Professor Emeritus of History*
 William Bernard Peach (1951), Ph.D., *Professor Emeritus of Philosophy*
 Olan Lee Petty (1952), Ph.D., *Professor Emeritus of Education*
 Leland R. Phelps (1961), Ph.D., *Professor Emeritus of Germanic Languages and Literature*
 Jane Philpott (1951), Ph.D., *Professor Emeritus of Botany and Professor Emeritus of Wood Anatomy*
 Jacques C. Poirier (1955), Ph.D., *Professor Emeritus of Chemistry*
 William H. Poteat (1960), Ph.D., *Professor Emeritus of Religion*
 Philip Pratt (1966), M.D., *Professor Emeritus of Pathology*
 Jack J. Preiss (1959), Ph.D., *Professor Emeritus of Sociology*
 Richard A. Preston (1965), Ph.D., *William K. Boyd Professor Emeritus of History*
 James Ligon Price, Jr. (1952), Ph.D., *Professor Emeritus of Religion*
 Louis DuBose Quin (1957), Ph.D., *James B. Duke Professor Emeritus of Chemistry*
 Jacqueline A. Reynolds (1969), Ph.D., *Professor Emeritus of Cell Biology*
 Lawrence Richardson, Jr. (1966), Ph.D., *James B. Duke Professor Emeritus of Classical Studies*
 J. David Robertson (1966), M.D., Ph.D., *James B. Duke Professor Emeritus of Neurobiology*
 Hugh G. Robinson (1964), Ph.D., *Professor Emeritus of Physics*
 Theodore Ropp (1938), Ph.D., *Professor Emeritus of History*
 Mabel F. Rudisill (1948), Ph.D., *Associate Professor Emeritus of Education*
 Charles Richard Sanders (1937), Ph.D., *Professor Emeritus of English*
 Lloyd Saville (1946), Ph.D., *Professor Emeritus of Economics*
 Harold Schiffman (1963), Ph.D., *Professor Emeritus of Psychology*
 Knut Schmidt-Nielsen (1952), D.Ph., *James B. Duke Professor Emeritus of Physiology and Zoology*
 Anne Firor Scott (1961), Ph.D., *William K. Boyd Professor Emeritus of History*
 William E. Scott (1958), Ph.D., *Professor Emeritus of History*
 Joseph R. Shoenfield (1952), Ph.D., *Professor Emeritus of Mathematics*
 William H. Simpson (1930), Ph.D., *Professor Emeritus of Political Science*
 Donald S. Smith II (1961), M.H.A., *Assistant Professor Emeritus of Health Administration*
 Grover C. Smith (1952), Ph.D., *Professor Emeritus of English*
 John R. Spencer (1978), Ph.D., *Professor Emeritus of Art History*

William J. Stambaugh (1961), Ph.D., *Professor Emeritus of Environmental Studies*
William Franklin Stinespring (1936), Ph.D., *Professor Emeritus of Old Testament and Semitics*
Howard Austin Strobel (1948), Ph.D., *Professor Emeritus of Chemistry*
Elizabeth Read Sunderland (1939-42; 1943), Ph.D., *Professor Emeritus of Art*
Charles Tanford (1960), Ph.D., *James B. Duke Professor Emeritus of Physiology*
Richard L. Tuthill (1953), Ed.D., *Professor Emeritus of Economic Geography*
Patrick R. Vincent (1954), Ph.D., *Associate Professor Emeritus of Romance Languages*
F. Stephen Vogel (1961), M.D., *Professor Emeritus of Pathology*
William D. Walker (1971), Ph.D., *Professor Emeritus of Physics*
Bruce W. Wardropper (1962), Ph.D., *William Haynes Wannamaker Professor Emeritus of Romance Studies*
Richard Lyness Watson, Jr. (1939), Ph.D., *Professor Emeritus of History*
Henry Weitz (1950), Ed.D., *Professor Emeritus of Education*
Paul Welsh (1948), Ph.D., *Professor Emeritus of Philosophy*
Robert W. Wheat (1958), Ph.D., *Professor Emeritus of Microbiology*
Karl Milton Wilbur (1946), Ph.D., *James B. Duke Professor Emeritus of Zoology*
Pelham Wilder, Jr. (1949), Ph.D., *University Distinguished Professor Emeritus of Chemistry*
Hilda Pope Willett (1948), Ph.D., *Professor Emeritus of Microbiology*
George W. Williams (1957), Ph.D., *Professor Emeritus of English*
William Hailey Willis (1963), Ph.D., *Professor Emeritus of Greek in Classical Studies*
Thomas George Wilson (1959), Sc.D., *Professor Emeritus of Electrical Engineering*
Cliff W. Wing, Jr. (1965), Ph.D., *Professor Emeritus of Psychology*
Max A. Woodbury (1966), Ph.D., *Professor Emeritus of Computer Science*
James G. Yoho (1984), Ph.D., *Professor Emeritus of Forestry*
Charles R. Young (1954), Ph.D., *Professor Emeritus of History*
Franklin W. Young (1944-50; 1968), Ph.D., *Amos Ragan Kearns Professor Emeritus of New Testament and Patristic Studies*

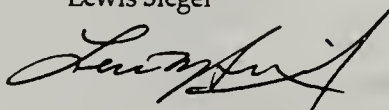
TO THE PROSPECTIVE GRADUATE STUDENT

A graduate school is where excellence in scholarship is established in a university. At Duke, the Graduate School is where the two essential functions of a university, teaching and research, truly come together. Over the years Duke's strength at the graduate level has grown in all the main fields of knowledge. The 1980s were particularly fruitful years for recruitment of faculty, establishment of new programs, and attraction of outstanding students. The international distinction of the faculty continues to grow in the 1990s. The laboratories, libraries, and computer facilities, already among the very best, are targets of major enhancements in the next decade. Yet the Graduate School remains small enough so that personal contact is a central feature of our programs, and fruitful interaction across disciplines is a common experience, both for faculty and students.

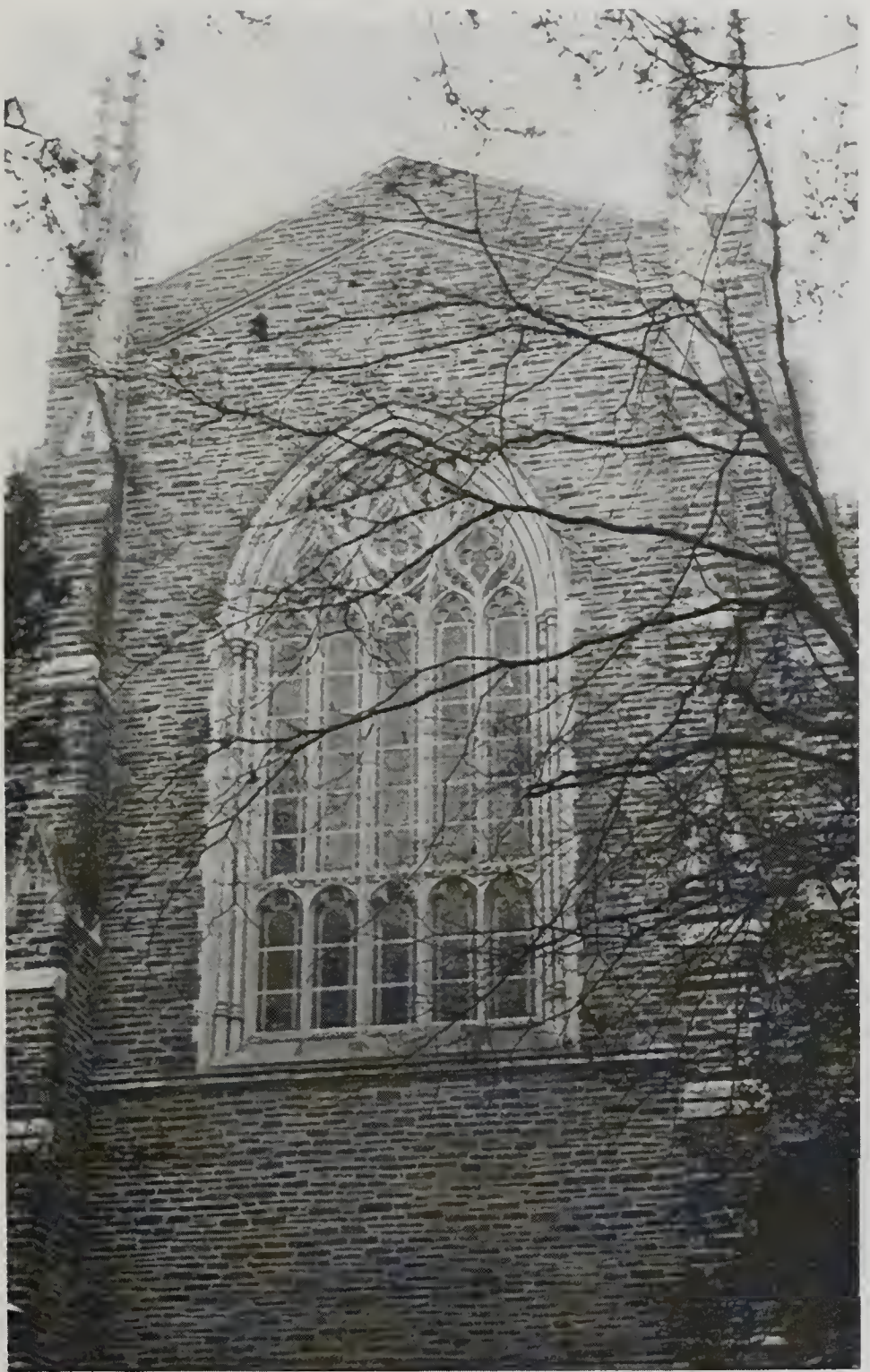
For the student in search of a strong graduate education, Duke University has much to offer. This is a community in which minds and ideas grow. We provide training for many careers, but we seek also to foster personal creativity and to provide stimulating yet congenial surroundings for productive education and research.

The following pages provide the information you require in making the important choice of the course of your graduate education. We look forward to welcoming you to the Duke community of scholars.

Lewis Siegel



Dean of the Graduate School



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Admission



Degree and Nondegree Admission

Students who wish to undertake graduate work at Duke University, whether for degree or nondegree purposes, must be formally admitted to the Graduate School by the dean. Prerequisites for admission include a bachelor's degree (or the equivalent) from an accredited institution and, for degree programs, satisfactory scores on the Graduate Record Examination. Individual departments may specify additional prerequisites, which can be found in the chapter on "Courses of Instruction."

Students who do not intend to earn an advanced degree at Duke, but who wish to take graduate courses, may apply for nondegree admission. Such admission is granted in three different categories: (1) admission as a regular nondegree student with a particular department; (2) admission as a special nondegree student without departmental affiliation through the Office of Continuing Education; and (3) admission as an unclassified student in the summer session only.

Credits earned by nondegree students in graduate courses taken at Duke before full admission to the Graduate School may be carried over into a graduate degree program if (1) the action is recommended by the student's director of graduate studies and approved by the dean, (2) the work is not more than two years old, (3) the amount of such credit does not exceed one semester at full-time tuition, and (4) the work has received grades of *G* or better.

Students who have discontinued a program of degree work at Duke must apply for readmission to the Graduate School. Those who discontinue study *prior* to completing a degree must, by letter, request permission of the dean to be readmitted to the degree program; those who discontinue study *after* earning a master's degree must file a new application for the doctoral program.

Admission Procedures*

A student seeking admission to the Graduate School should obtain an application bulletin from the Graduate School Admissions Office. This packet contains the necessary forms and detailed instructions on how to apply. All parts of the application forms must be filled out completely, signed, and returned to the Graduate School Admissions Office accompanied by the necessary supporting documents and a nonrefundable application fee. This fee is \$65† in U.S. currency (check or money order payable to Duke University

*This chapter is a brief summary of, and supplement to, information contained in the current Graduate School application bulletin, which should be consulted for more comprehensive information on all aspects of the process of applying for admission and award.

†All fees are based on current charges and are subject to change without notice.



through a U.S. bank). However, if the application is received by December 1, the fee is reduced to \$50. The required supporting documents are: (1) one copy of an official, *confidential* transcript from each institution (undergraduate or graduate) attended, sealed in a *confidential* envelope and signed-across-the-seal by the registrar at the institution; (2) three letters of evaluation, written on the forms provided and returned by the applicant in the confidential envelopes that have been sealed-then-signed by the evaluators; (3) official scores on the Graduate Record Examination General Test for applicants to all departments; and (4) official scores on the Graduate Record Examination Subject Test for applicants to certain specified departments. Please consult the current application bulletin for more detailed information on all requirements.

Materials submitted in support of an application are not released for other purposes and cannot be returned to the applicant.

Students applying for fall admission and award should take the Graduate Record Examination no later than the October testing in the previous year in order to meet our deadlines. Information on the times and places of the Graduate Record Examinations can be obtained from the applicant's college or the Educational Testing Service, P.O. Box 6000, Princeton, New Jersey 08541-6000.

Additional Procedures for Foreign Students. Fully qualified students from outside the United States are invited to apply for admission to full-time study in the Graduate School. The foreign student must, in addition to the information required of all students, submit with the application materials: (1) if the student's native language is not English, certification of English proficiency demonstrated by official scores from the Test of English as a Foreign Language (TOEFL), administered through the Educational Testing Service, P.O. Box 6155, Princeton, New Jersey, 08541-6155 (the Graduate School requires a minimum score of 550); and (2) a statement showing financial arrangements for the proposed term at Duke (estimated costs per calendar year are about \$28,000).*

English Language Requirements for Foreign Students. All international students whose native language is not English must enroll in two sections of English 200 during their initial year at Duke, unless formally waived from this requirement by the Graduate School upon certification of competency in English

Part-Time Graduate Study. Many graduate departments will consider applications from students wishing to pursue degree study on a full-time or part-time basis. (Consult application materials for listing of departments.) Admission requirements, procedures, and deadlines are the same in either case. *Visa restrictions do not allow nonimmigrant students to pursue graduate study on a part-time basis.*

Master of Arts in Liberal Studies Procedures. Students seeking admission to the MALS should contact that program directly for information, requirements, and special application materials.

Summer Session Procedures. Students who wish to begin graduate work during the summer must check first with the department of interest concerning available courses or research work, as well as funding possibilities; some departments have summer offerings and others do not. Applications should be submitted according to the fall deadline schedule, since summer files will be reviewed along with others who plan to begin in late August.

In addition to the application for regular admission to the Graduate School, students must also apply directly to the summer session. Application forms and catalogues may

*Figures are based on 1993-94 charges and are subject to change without notice.

be obtained from Summer Session, Duke University, Box 90059, Durham, North Carolina 27708-0059, telephone (919) 684-2621.

Students who wish to take graduate courses in the summer but not pursue a graduate degree may be admitted to the summer session under the following categories. *Duke Students:* current students in good standing may attend the summer session without formal application. *Non-Duke Students:* other persons may seek admission to the summer session provided they are (or were) in good standing at a fully accredited college or university.

Continuing Education Procedures. A student seeking admission as a nondegree continuing education graduate student at Duke must have received a bachelor's degree and must either reside in the area or be moving to the area with the intention of residing here for a substantial period of time. Application materials and additional information may be obtained from the Office of Continuing Education, Duke University, Box 90700, Durham, North Carolina 27708-0700, telephone (919) 684-6259.

Review of Application and Notification of Status. All applications are considered without regard to race, color, religion, national origin, handicap, veteran status, sexual orientation or preference, sex, or age.

Application files are assembled in the Graduate School Admissions Office, where all official record-keeping is maintained. Applications, once processed, are sent to the departments. A departmental admissions committee, usually headed by the director of graduate studies, reviews the applications and makes recommendations to the dean. Formal admission to the Graduate School is offered only by the dean, who will send the official letter of admission and an acceptance form. The process of admission is not complete until the student returns the acceptance form. *Admission may not be deferred from one term to another; an admission offer is only for the semester specified in the letter of admission.*

Immunizations. North Carolina Statute G.S.: 130A-155.1 states that no person shall attend a college or university, public, private, or religious, excluding students attending night classes only and students matriculating in off-campus courses, unless a certificate of immunizations against diphtheria, tetanus, whooping cough, poliomyelitis, red measles (rubeola), and rubella is presented to the college or university on or before the first day of matriculation. The required forms and instructions are provided to students in the packet of materials sent with the letter of admission.

Deadlines for Application

It is the applicant's responsibility to make certain that the Graduate School Admissions Office has received all required materials by the appropriate deadlines. Only complete applications can be considered. To ensure that the admissions office will have adequate time to assemble all items submitted on an applicant's behalf, applications should be sent *at least* two weeks before the stated deadlines.

Consult current application materials for a more detailed explanation of deadlines and their enforcement.

FOR FALL SEMESTER

December 1. Deadline for postmark of applications eligible to pay the reduced application fee of \$50. All applications postmarked after this date must be accompanied by a fee of \$65 or they will not be processed.

December 31. Final deadline for postmark of applications for admission and award to all programs for the fall 1995 semester. (Note: Applications must arrive in the Graduate School within fourteen days of the December 31 postmark date.)

Applications postmarked *and* completed by this date are guaranteed a review; those postmarked/completed after this date are not guaranteed consideration. Late applica-

tions may be considered for admission only if all spaces have not been filled, and for financial aid, only if funds are still available. All students seeking fall admission should meet the December 31 deadline, since it is likely that enrollment in many departments will be filled soon after this date.

The final cut-off date for processing new applications is July 15. Few departments, however, continue to review applications this late. No applications for fall received after this date will be processed.

FOR SPRING SEMESTER

November 1. Final date for completion of applications for admission to the spring semester, space permitting. Not all departments accept new students for the spring semester, nor is financial aid readily available for spring matriculants.

FOR SUMMER SESSION

Students seeking admission to the Graduate School for study in the summer session should apply for Graduate School admission according to the fall deadline schedule and for summer session admission according to the following schedule:

April 15. Last day for completing summer session application to Term I.

May 15. Last day for completing summer session application to Term II.

Financial Information



Fellowships and Scholarships

The Duke University Graduate School and its graduate programs offer a wide array of financial support. Funding is available from annually allocated awards funds, instruction, endowed fellowships, foundation and other private support, as well as federal research and training grants. A student who wishes to be considered for any of the fellowships or assistantships mentioned in this section should so indicate on the application form for admission and award. Selection of award recipients is made on the basis of academic merit and departmental recommendations.*

(While personal financial need may not be the basis for the granting of many graduate awards, the Graduate School requests that all matriculating students complete the Free Application for Federal Student Aid. This application will be mailed to you upon acceptance.)

In addition to those awards available through the university, applicants are urged to compete for national and foundation awards available for graduate study. The following list provides a few of the awards available, from these sources, and from within the university.

NATIONAL, REGIONAL, AND FOUNDATION AWARDS

National Science Foundation Graduate Fellowships and Minority Fellowships: predoctoral fellowships for students in the physical, biological, and social sciences. Applications are available from the National Science Foundation, 2101 Constitution Ave., N.W., Washington, D.C. 20418.

Jacob Javits Fellowships: fellowships for students in the arts, humanities, and the social sciences. Javits Fellowship Program, U.S. Department of Education, Room 3514, Rob-3, Mail Stop 3327, Washington, D.C., 20202. (202) 732-2945.

Howard Hughes Fellowships: predoctoral fellowships in biological sciences. Applications are available from the Hughes Fellowship Program, The Fellowship Office, National Research Council, 2101 Constitution Avenue, Washington, D.C., 20148. (202) 334-2872.

*Students receiving financial support (other than loans) must be registered full time and must maintain satisfactory progress in their degree program.

Andrew W. Mellon Fellowship: predoctoral fellowship for students who aspire to teaching and scholarship in the humanities. For information write to Fellowships in Humanistic Studies, The Woodrow Wilson National Fellowship Foundation, P.O. Box 288 (300 Alexander Street), Princeton, N.J. 08542-0288. (609) 452-7007.

Ford Foundation Predoctoral Fellowship for Minorities: c/o Fellowship Office National Research Council, 2101 Constitution Avenue, Washington, D.C., 20418. (202) 334-2872.

Shell Fellowships are available to students in the social sciences engaged in dissertation research on developing countries. Recipients must be citizens of the United States or permanent residents intending to become United States citizens. The fellowships are designed to cover the expenses of field research in the preparation of doctoral dissertations. The stipend for each fellowship is \$7,000 plus a reasonable amount for transportation expenses. Recipients are chosen competitively from departmental nominees. Inquiries should be made to the Program Coordinator, Center for International Studies, 2122 Campus Drive, Durham, North Carolina 27706.

Frederick K. Weyerhaeuser Forest History Fellowship. This fellowship is available campus-wide to students who wish to study broadly in the area of forest and conservation history. The annual stipend is \$10,000. Inquiries should be made to the Forest History Society, 701 Vickers Avenue, Durham, North Carolina 27701.

COMPETITIVE GRADUATE SCHOOL FELLOWSHIPS

These competitive fellowships are offered through the Graduate School. Normally, students will not make direct application to these awards, but are nominated by their department.

Fellowships for Incoming Students

James B. Duke Fellowships. The James B. Duke One-Hundredth Anniversary Fund provides fellowships for students who wish to pursue a program leading to the Ph.D. degree in the Graduate School at Duke University. Its objective is to aid in attracting and developing outstanding scholars at Duke. Selection of recipients is made by a faculty committee upon nomination by the appropriate department. These fellowships provide a \$3,000 stipend supplement for four years to any other award the student receives from the department, the Graduate school, or national fellowships. In addition, the student will receive a cost of relocation allowance of \$1,000 upon matriculation.

International Fellowships are available to outstanding students from foreign countries who have completed their undergraduate education in institutions outside the United States. Fellowships provide an annual stipend of \$10,000, payable for twelve months, plus tuition and health fees. They are renewable for three years. Recipients are chosen competitively from departmental nominees by a faculty committee.

Julian Price Fellowship: provides competitive stipend and tuition for students in the humanities.

Fellowships for Advanced Students

Katherine Stern Fellowship: dissertation-year fellowships provided for advanced graduate students.

Named Instructorships in Arts and Sciences. Five of these awards are provided jointly by the Graduate School and Trinity College. The student is required to teach one course during the academic year in which they hold the award.

Aleane Webb Dissertation Research Fellowships provide support for miscellaneous research projects associated with the dissertation.

Conference Travel Awards fund advanced students who are presenting papers at national conferences.

International Research Opportunities

The Graduate School works to secure funding for advanced students who need to do research overseas. Below are a few of the programs currently available.

Advanced International Fellowship: The Graduate School offers several research awards to students who must travel overseas.

Dissertation Travel Awards are provided for overseas research travel.

Organization for Tropical Studies: the Graduate School provides limited funding for students to travel to Costa Rica to participate in this important program.

Sigma Xi: both the national and local chapters of this scientific honorary society offer research grants to graduate students. The Graduate School currently provides matching funding for these awards.

Exchange Programs: the Graduate School has developed exchange programs with a number of foreign universities, including the Free University of Berlin, and Potsdam and Humbolt universities.

Social Science Research Council—Predissertation Fellowships: offers important international fellowships at the early stages of research. Graduate School participation in this program also includes workshops treating problems and opportunities students may encounter while in the field.

GRADUATE FELLOWSHIPS FOR MINORITY STUDENTS

Duke Endowment Fellowships. The Duke Endowment fellowship provides four years of graduate support. A stipend of \$10,800 for each calendar year, plus payment of tuition and registration and health fees for the fall and spring semesters, and registration and health fees for the summer sessions, is provided. Support for years one and two is provided by the Graduate School and requires no additional service. Support for years three and four is provided by the department and may include service in the form of a research or teaching assistantship. In addition, in the fifth or final year, fellows are eligible to compete for dissertation support.

Presidential Fellowships. The Presidential Fellowship provides four years of graduate support. A stipend of \$11,000 for each calendar year, a book award of \$500, plus payment of tuition and registration and health fees for the fall and spring semesters, and registration and health fees for the summer sessions, is provided. Support for years one and two is provided by the Graduate School and requires no additional service. Support for years three and four is provided by the department and may include service in the form of a research or teaching assistantship. In addition, in the fifth or final year, fellows are eligible to compete for dissertation support.

Patricia Roberts Harris Fellowship Program. This program makes direct fellowship grants available to colleges and universities for the purpose of providing financial support to minority and women graduate and professional students who demonstrate financial need. Duke has received fellowship support through this program and will continue to apply for this support for our graduate departments. The fellowships are funded by the Department of Education and are awarded for up to three years of graduate study.

The National Consortium for Educational Access (NCEA) Fellowship. The NCEA is a partnership agreement between historically black colleges and universities, Ph.D.-degree granting institutions, and corporations. The goals of the NCEA are (1) to increase the pool of black Americans holding the Ph.D. degree in disciplines where they are now underrepresented; and (2) to address the underrepresentation of black faculty in the nation's colleges and universities. The NCEA provides fellowship support for both students and faculty enrolled in a member Ph.D.-granting institution. Students are eligible to receive a minimum of \$3,000 per year, while faculty are eligible for a minimum of \$5,000 per year in assistance. These fellowships are in addition to financial assistance the Ph.D. candidates receive from the participating institution. Students can apply for this fellowship directly through the NCEA by obtaining an application from a member

institution or by writing to: Dr. Leroy Ervin, Executive Director, National Consortium for Educational Access, 296 Interstate North Parkway, Suite 100, Atlanta, GA 30339.

DEPARTMENTAL FELLOWSHIPS, ENDOWMENTS, RESEARCH AND INSTRUCTIONAL ASSISTANTSHIPS

The majority of funding available for graduate study is provided by the student's department. Below are listed some of the ways a student may be supported. For specific information, contact the program director of graduate studies.

Fellowships and Scholarships: various departments offer fellowship stipends (ranging up to \$13,500), and tuition scholarships to students pursuing graduate studies. Information may be obtained from the individual departments.

Endowed Fellowships: Many departments offer endowed fellowship support. These include the Gurney Harris Kearns and the Gertrude Weil Fellowships in Religion, the Frank T. de Vyver and the Calvin Bryce Hoover Fellowships in Economics, the Clare Hamilton Memorial Endowed Fellowship in Clinical Psychology, the Charles R. Hauser Fellowship in Organic Chemistry, the Robert R. Wilson Fellowship in English, and the Anne McDougall Memorial Award in Women's Studies. Selection for these fellowships is made through faculty committees.

Research Assistantships. Appointments are available for graduate students whose special training and qualifications enable them to serve as assistants to individual staff members in certain departments. Stipends may be up to \$13,500 depending on the nature of the assistance and the assisting time required.

Part-time Instruction. Several departments offering graduate work have exceptionally qualified graduate students work as part-time instructors, tutors, and teaching assistants. Amounts of these assistantships vary and interested applicants should contact their departments directly.

PAYMENT OF AWARDS

The payment of stipends for graduate assistantships and fellowships starts on September 25 and is made in equal payments on the twenty-fifth day of each month thereafter. Fellowship stipends are paid on the last working day of the month, beginning in September. Under the Tax Reform Act of 1986, the only graduate student financial assistance exempt from taxation are amounts paid for tuition, fees, books, supplies, and equipment required for course instruction. If services are required for payment of tuition and fees, then that tuition is considered income and is subject to taxation. The Graduate School office will supply detailed information.

It is the responsibility of the student to be sure that tuition and fees are paid or that arrangements have been made with the appropriate office or department for submission of tuition payment notices to the bursar (101 Allen Building). Graduate students should contact either the director of graduate studies in their department or the Graduate School financial aid coordinator (120 Allen Building) depending upon the type of award. Faculty, senior administrative staff, employees, and eligible spouses not in degree programs should contact Harrison Brooke (705 Broad Street) regarding tuition benefits.

LOANS

Students who anticipate a need to supplement their financial resources through loans or college work-study employment must obtain and complete Free Application for Federal Student Aid. These forms are available at most financial aid offices or from the Financial Aid Coordinator, Graduate School, Duke University, Durham, North Carolina 27706. A student seeking a loan should contact his or her state lending agency, or request an application from the Financial Aid Office.

Only students with full-time status who are U.S. citizens at permanent residents and who meet the federal criteria for need are eligible for loans. Loan funds are provided through the Carl Perkins Student Loan Program after a student has borrowed the

maximum from the Federal Stafford Loan Program. Generally, loans made from these funds, as is the case with loans from state agencies, bear no interest charge to qualified borrowers while they maintain student status and for a short period thereafter. Interest during the repayment period is at a favorable rate.

Inquiries concerning loans should indicate the department of intended matriculation and include all pertinent information concerning application to a state agency. These inquiries should be addressed to the Financial Aid Coordinator, Graduate School, Duke University, Durham, North Carolina 27706.

WORK-STUDY PROGRAM EMPLOYMENT

Funds are available through the college work-study program for short-term or part-time employment of graduate students. A student who wishes to apply for work-study must complete a Free Federal Financial Aid form. Students considering the possibility of work-study for the fall should submit Free Federal Financial Aid forms by April 15. Eligibility requirements are similar to those of the federal loan programs. In addition to departmental employment opportunities, the placement office maintains a listing of employment openings for students.

SUMMER FINANCIAL AID

A limited amount of financial aid is available to students in summer study. Summer financial aid, determined according to demonstrated need, may consist of institutional grant funds and/or low interest loans from the Stafford Student Loan program and the Carl Perkins Student Loan program. To qualify for summer school aid, a student must be enrolled or accepted for enrollment at Duke during the academic year immediately preceding the summer for which aid is requested. (Students must be registered for summer school in order to receive summer support. Students enrolled only for the summer may be eligible to borrow from outside lenders under the Stafford program in their home states or from the schools at which they are regularly enrolled. They should contact their college's financial aid office or the state's department of higher education for information and applications.) The college work-study aid is determined by the financial aid office based upon the student's financial need and the availability of funds. Graduate awards are determined by departments depending on usual criteria and availability of funds.

Student Expenses

Although many students will receive financial assistance for their graduate education, students are responsible for ensuring that they have the means to support themselves, and the ability to pay tuition and fees due the university. Below is a summary of expected costs

COST OF LIVING

For 1994-95, the estimated cost of living in Durham for a single U.S. citizen (including health insurance but no other university fees) is approximately \$10,300 for the academic year. Obviously this cost will vary with individual needs. For a specific estimate of the cost of education for loan certification, contact the Graduate School Financial Aid Office. Cost may also differ for international students; contact Graduate Admissions for further information.

TUITION AND FEES

Tuition

Tuition is charged on a per semester basis for Ph.D. students, and on a per unit basis for masters and nondegree students. (The tuition rate for the masters programs in

physical therapy and international development research are set separately from other graduate programs; information concerning these rates can be obtained from the program directors.)

For new Ph.D. students entering in fall 1994, the charge for tuition is \$5,820 per semester. A charge for tuition is levied for six semesters of graduate study. One semester of credit may be granted for those entering with a previous graduate degree or for nondegree work done at Duke prior to matriculation.

For masters and nondegree students, the tuition is \$485 per unit or semester hour.

REGISTRATION FEE

All graduate students, with the exception of students registered through Continuing Education, will be charged a registration fee for every semester of residence. For 1994-95, the registration fee charge is \$800 per semester. Registration for summer 1995 is also \$800.

TRANSCRIPT FEE

All entering students will be charged in the fall semester a one-time mandatory fee of \$35 for transcripts. This fee entitles the student to an unlimited number of Duke transcripts.

STUDENT HEALTH FEE

All full-time students and part-time degree candidates are assessed a fee each semester for the use of the Student Health Service. For fall and spring, the fee is \$378 (\$189 each semester). For summer, the fee is \$116. This fee is distinct from health insurance, and does not provide major medical coverage. For the services covered by this fee see the chapter "Student Life".

HEALTH INSURANCE

Students will be charged for health insurance in the fall semester, unless proof of other health insurance is provided. For 1993-94, the Student Health Insurance was \$650 for the full year. Information on the coverage provided by this insurance is available from the Office of the Bursar.

STUDENT ACTIVITY FEE

All graduate students will be charged a student activity fee of \$10 per semester.

OTHER FEES

Thesis or Dissertation Fees. Fees incurred in connection with a thesis or dissertation are as follows:

Binding fee, three university copies of thesis or dissertation	\$25
Microfilming fee, doctoral degree only, upon final submission	\$50
Copyright fee (doctoral degree only, optional)	\$35

Athletic Fee. An athletic fee of \$125 for basketball games is *optional* and payable early in the fall semester.

Marine Laboratory Fee. For Marine Laboratory investigators' research table fee, see the publication *Marine Laboratory 1993*.

Audit Fee. Auditors are permitted on a space available basis with the consent of the instructor. Students registered full time during fall and spring may audit courses without charge. Audit fees are \$160 per course.

Vehicle Fee. Resident students are required to pay an annual fee of \$135 for gated lots, \$55 for ungated lots, or \$30 for each two-wheeled motor vehicle. Resident students registering a vehicle for the first time after January 1 are required to pay \$37 for a motor vehicle or \$19 for a two-wheeled motor vehicle.

If a motor vehicle or a two-wheeled vehicle is removed from the campus permanently and the permit is returned to the traffic office prior to January 20, there will be a refund of \$25 for a motor vehicle and \$12.50 for a two-wheeled motor vehicle. Gated lot permits are prorated accordingly.

Students enrolled in the summer session only must also register their motor vehicles with the traffic office. The fee is \$17.50 from May 1 through August 31, or \$7 for each thirty-day period.

PAYMENT OF ACCOUNTS

Duke University does not have a deferred payment plan for tuition, fees, or other charges. New students are expected to pay tuition and fees at the time of matriculation. Following first enrollment in the Graduate School, monthly invoices are sent to each student by the bursar's office. As a part of the agreement of admission to Duke University a student is required to pay all invoices upon receipt.

Graduate students who receive payments from the university for fellowships, assistantships, or employment and who plan to pay tuition and fees and/or campus housing charges via payroll deduction must make arrangements for payroll deduction in the bursar's office by the published deadline for each semester in order to avoid assessment of the late payment charge.

All full-time graduate students and part-time degree candidates are charged the student health fee as well as student accident and sickness insurance coverage unless they file properly completed and signed insurance waivers in the bursar's office by the invoice date. The student accident and sickness insurance payment is due in full at the beginning of the term. Payment in full for campus housing is due at the beginning of each semester unless the student qualifies for university payroll deduction.

Late Payment Charge. A late registration fee of \$25 is charged any student who does not complete registration during the announced registration periods. Also, students who fail to pay by the due date the total amount of an invoice received from the bursar will be charged a late payment fee. That fee is assessed at the rate of 1 1/4 percent per month applied to the past due balance and accrued from the billing date of the invoice (matriculation date for new students).

Restrictions. A student in default on tuition or fee charges will not be allowed to register for classes, receive a transcript of academic records, have academic credits certified, be granted a leave of absence, or receive a diploma at graduation. In addition, such students may be subject to withdrawal from the Graduate School.

Reduction in Registration and Tuition. Full refunds are granted students who reduce registration on the drop/add date at the beginning of each semester. A reduction in registration and tuition necessitated by changes in departmental service requirements for assistants may be made during the first week of classes with approval of the dean.

Refunds for Withdrawal from School during Fall and Spring Semesters. For students who withdraw from school or who are withdrawn by the university, refunds of tuition and fees are governed by the following policy.

1. In the event of death, refund of full tuition and fees will be granted.
2. In all other cases of withdrawal from the university, students may have tuition refunded according to the following schedule:
 - a. Withdrawal before classes begin: full refund;

- b. Withdrawal during the first or second week of classes: 80 percent refund (the student health fee will not be refunded);
 - c. Withdrawal during the third, fourth, or fifth week of classes: 60 percent refund (the student health fee will not be refunded);
 - d. Withdrawal during the sixth week: 20 percent refund (the student health fee will not be refunded);
 - e. Withdrawal after the sixth week: no refund.
 - f. Tuition charges paid from grants or loans will be restored to those funds on the same pro rata basis and will not be refunded or carried forward.
3. If a student has to drop a course for which no alternate registration is available, drops special fee courses (music, golf, etc.), or drops a paid audit during the first two weeks of the drop/add period, a full refund may be granted with the approval of the dean. (The student health fee will not be refunded.)

Special Tuition Benefits for Employees. The Graduate School recognizes a special obligation to encourage the professional and personal advancement of employees. The university thus grants reductions in tuition to eligible employees enrolling in courses offered by the university.

Half-time employees with one or more years of continuous service who receive permission of their supervisors may take up to two courses a semester and will be charged one-half of the tuition rate. This benefit applies *only* to nondegree work. Full-time employees (30 or more hours a week) with two or more years of continuous service who receive permission to take such courses will be charged one-tenth the tuition rate for up to two courses per semester and will be permitted to audit at no charge. This benefit applies to degree work as well as nondegree. Tuition reduction for undergraduate or graduate course work is considered taxable income under current law.

Employees who wish to take graduate classes on a nondegree basis apply through Continuing Education. No Graduate Record Exam is required at this point. If an employee is later admitted into a degree program, up to one semester of credit may then be transferred into that program if certain criteria are met (see page 55).

Employees wishing to enroll in a graduate degree program may apply directly to the Graduate School. Since not all of these programs can accommodate part-time study, please make early contact with the appropriate department for advice on your particular educational needs.

Eligible employees should consult the Benefits Office, 705 Broad Street, (919) 684-6723, at least three weeks in advance of payment date to obtain the appropriate tuition voucher.

Satisfactory Progress. A graduate student is expected to make satisfactory progress in his or her program in order to remain enrolled in a degree program or to receive financial aid. (See the section on grades in the chapter "Regulations.") A student is considered to be making satisfactory progress if he or she is eligible to continue during the academic year. Determination of academic load is made at the end of the drop/add period for each semester. If hours are reduced below these levels, the Graduate School Financial Aid Office must be notified and some monies or types of aid may have to be repaid. The student should contact the financial aid office if this situation is contemplated or occurs.



Registration



Registration

All students who enrolled prior to fall 1994 should consult the bulletin of their year of matriculation for registration procedures and requirements.

Registration Requirements. All students must register each fall and spring semester and pay a registration fee each semester until all degree requirements are completed, unless waived by an approved leave of absence granted by the dean. Failure to maintain continuous registration each fall and spring semester will result in administrative withdrawal from the university.

Leave of Absence. Students who have been on leaves of absence and who intend to resume a degree program must give the department and the dean notice of this intention two months before registration.

Doctoral students. In addition to the registration fee, doctoral students matriculating fall 1994 must also register for a total of 6 semesters of full-time tuition. For Ph.D. students, approved transfer of an earned graduate degree may reduce the number of semesters of full-time tuition required for the degree to five semesters. After the 6 semesters of tuition, doctoral students will be charged only the registration fee. Specific course requirements for doctoral students are set by the departments.

Master's students. A master's student (except for those students enrolled in the two-year physical therapy and public policy studies programs) will register for a minimum of 30 units of degree credit and for any course units beyond the 30 required of their program. A registration fee for each semester is required. Approved transfer course work into a master's program will *not* reduce the minimum registration for a master's degree of 30 units at Duke University.

Except for these registration procedures, all other degree regulations remain as stated in the other sections of this bulletin.

Registration Periods. All students who are enrolled in the Graduate School and who have not been granted a leave of absence by the dean must register each fall and

spring until all degree requirements are completed. New students will register immediately prior to the first day of classes in either term; continuing students register during the announced registration periods (set by the Registrar's Office) in November and April.

Late Registration. All students are expected to register at the times specified by the university. A late registration fee of \$25 is charged any student registering late, including a current student who delays registering until the registration for new students.

Change of Registration. During the first two weeks of the fall or spring semester, registration may be changed with the approval of the director of graduate studies if no reduction of fee is entailed. If fees are reduced, the approval of the dean of the Graduate School is required and must be received no later than the first week of the semester.

Summer Registration. Students who are in residence at Duke University during the spring and who plan to enroll for courses in the summer session may have their course programs approved by the director of graduate studies during the week of Graduate School registration in March. Summer session students may register at announced time beginning with the March registration period and up to the Wednesday preceding the start of the appropriate term. Graduate students who are in residence during the summer session, but not enrolled in any courses, pay only the registration fee.

The university does not mail statements for summer session tuition and fees. All tuition and fees should be paid in the Office of the Bursar (101 Allen Building) at least *five full working days* prior to the first day of class (see summer session calendar). Students who fail to register and pay all tuition and fees before this deadline will be assessed a late charge. Failure to pay tuition and fees by the end of the drop/add period will result in administrative withdrawal of the student.

Summer session students may add a course or courses before or during the first three days of the term. Courses may also be dropped before and during the first three days, but a 20 percent tuition fee will be charged (1) if the course is not dropped before the first day, and (2) the dropped course(s) results in a total tuition reduction. Courses dropped after the third day of classes are not eligible for tuition refund.

Additional Registration Requirements. It is necessary to be a fully registered student according to the regulations listed in the chapter on "Registration" in order to be eligible for library carrel and laboratory space, student housing, university and some outside loans, and the Student Health Service, including accident and sickness insurance. See the chapter on "Student Life."



Regulations



General Academic Regulations

Credits. The following regulations pertain to credits earned outside the Duke University Graduate School:

Graduate Credit Earned before the A.B. Degree Is Granted. Ordinarily no credit will be allowed for graduate courses taken before a student has been awarded the A.B. or B.S. degree. However, an undergraduate student at Duke University, who at the beginning of the final semester lacks no more than three courses in order to fulfill the requirements of the bachelor's degree, may apply for admission to the Graduate School as a nondegree student for that final semester. If the student meets the requirements for admission in a nondegree program, permission may be obtained from the dean of the Graduate School to enroll for graduate courses to bring the total program to no more than four courses (only one semester of full-time tuition credit for the Ph.D. program will be granted to nondegree students.). In addition to undergraduate registration, the student must register in and pay tuition for those courses to the Graduate School at the beginning of the semester in which graduate credit is to be earned in order for the courses to be credited toward a graduate degree program.

Transfer of Graduate Credits. For master's programs, the transfer of graduate credit does not reduce the required minimum registration of 30 units for a master's degree at Duke. For Ph.D. students, one semester of full-time tuition credit may be given if the student has completed a graduate degree at another institution. No credit will be given to those students who wish to receive a master's degree en route to the Ph.D. Up to one semester of tuition credit may be given to students who have completed graduate course work at Duke as nondegree students. Financial credit for the above programs will be given only after the student has completed one full-time semester in a degree-granting graduate program. (For Ph.D. students, departments are free to consider previous course work in determining further course requirements for the student—academic credit is distinct from financial credit or registration requirements for the degree.)

Summer Session Credit. Summer session credit does not mean degree credit at Duke University unless the student has been admitted as a degree candidate by one of the colleges or schools of the university. The majority of summer session courses carry 3

units of credit and require one term of residence. A student taking a course for credit is expected to do all the work required and to take the final examination, and will receive a grade. (G. I. Bill benefits are available only to those veterans who enroll for credit.)

Grades. Grades in the Graduate School are as follows: *E*, *G*, *S*, *F*, and *I*. *E* (excellent) is the highest mark; *G* (good) and *S* (satisfactory) are the remaining passing marks; *F* (failing) is an unsatisfactory grade; and *I* (incomplete) indicates that some portion of the student's work is lacking, for an acceptable reason, at the time the grades are reported. For students enrolled in the Graduate School, the instructor who gives an *I* for a course specifies the date by which the student must make up the deficiency. For unclassified graduate students enrolled in the summer session, a temporary *I* for a course may be assigned after the student has submitted a written request. If the request is approved by the instructor of the course, then the student must satisfactorily complete the work prior to the last day of classes of the subsequent summer term. If a course is not completed within one calendar year from the date the course ended, the grade of *I* becomes permanent and may not be removed from the student's record. The grade of *Z* indicates satisfactory progress at the end of the first semester of a two-semester course. A grade of *F* in a major course normally occasions withdrawal from a degree program not later than the end of the ensuing semester or term; a grade of *F* in any other course occasions at least academic probation.

Reciprocal or Interinstitutional Agreements with Neighboring Universities. Under a plan of cooperation between Duke University and the University of North Carolina at Chapel Hill, North Carolina Central University in Durham, and North Carolina State University at Raleigh, full-time students properly enrolled in the Graduate School of Duke University during the regular academic year, and paying full tuition to this institution, may be admitted to a maximum of two courses per semester at one of the other institutions in the cooperative plan. Under the same arrangement, students in the graduate schools in the neighboring institutions may be admitted to course work at Duke University. Credit so earned is not defined as transfer credit. To take advantage of this arrangement during any summer session term, the student registers each term for 3 units of credit at the home institution and 3 units of credit at the other institution, for a total of 6 units. All interinstitutional registrations involving extra-fee courses or special fees required of all students will be made at the expense of the student and will not be considered a part of the Duke University tuition coverage. This reciprocal agreement does not apply to contract programs such as the American Dance Festival.

Identification Cards. Graduate students are issued identification cards which they should carry at all times. The card is a means of identification for library privileges, athletic events, and other university functions or services open to them as university students. Students will be expected to present their cards on request to any university official or employee. The card is not transferable, and fraudulent use may result in loss of student privileges or suspension from the Graduate School. A report of the loss of a card must be given immediately to the registrar's office. The cost of a new ID card is \$5.

Courses Primarily for Undergraduates. With the approval of their director of graduate students, master's degree students may take a total of two courses below the 200 level and have them count toward the 30 required for their degree, provided that two conditions are met:

1. that such courses be over and above the graduate course requirements set by the department; and
2. that a grade of *B* or better be earned.

At the master's level, only two such courses will be counted toward the 30 units. Ph.D. students may take undergraduate courses with the approval of their director of graduate studies.

Withdrawal from a Course. For permissible changes during the first two weeks of the fall or spring semester and during the first three days of summer session term, see the chapter on "Registration." If a course is dropped without the necessary approval, the permanent record will, at the discretion of the dean of the Graduate School and with the permission of the instructor, list the course as *Withdrawal Error (WE)*. If a course is dropped after the two-week period during the fall or spring or after the first three days of classes during the summer, the status of the student at the time of withdrawal from the course will be determined and indicated on the permanent record as *Withdrew Passing (WP)* or *Withdrew Failing (WF)*.

Interruption of Program and Withdrawal from the Graduate School. Students are expected to meet academic requirements and financial obligations, as specified elsewhere in this bulletin, in order to remain in good standing. Certain nonacademic rules and regulations must be observed also. Failure to meet these requirements may result in summary dismissal by the appropriate officer of the university.

The university reserves the right, and matriculation by the student is a concession to this right, to request the withdrawal of any student whose academic performance at any time is not satisfactory to the university. A student who wishes for any reason to withdraw from the Graduate School during the fall, spring, or summer session should notify in writing both the director of graduate studies in the major department and the dean of the Graduate School prior to the date of the expected withdrawal and no later than the published last day of classes for that semester or summer session. If students wish to withdraw from courses in the summer session, they must consult both the director of graduate studies in the major department and the director of the Summer Session. For refunds upon withdrawal, see the chapter on "Financial Information."

A student who, after successfully completing one semester of graduate study, must withdraw before completion of a graduate program may, with the approval of the major department, request the dean to issue a certificate of graduate study.

Leave of Absence. A leave of absence for a period of time no longer than one calendar year may be granted because of medical necessity, full-time employment, acceptance of an external award judged likely to benefit the student as an individual but not related to the degree requirements, or other acceptable reasons. A request for a leave of absence should be originated by the student, endorsed by the student's major professor and director of graduate studies, and submitted to the dean of the Graduate School for consideration prior to the beginning of the semester for which the leave is requested. A student is eligible to request a leave of absence only after having completed at least one semester at Duke. Time limitations which pertain to the various degrees and the completion of courses on which a grade of *I* (incomplete) was earned are not waived.

See page 33 of this bulletin for further English proficiency requirements for foreign students.

Degree Regulations—The Master's Degrees

MASTER OF ARTS

Prerequisites. As a prerequisite to graduate study in the major subjects, a student must have completed a minimum of 24 undergraduate semester hours—ordinarily 12 semester hours of approved college courses in the major subject and 12 semester hours in the major or in related work. Since some departments require more than 12 semester hours in the proposed field of study, students should read carefully the special requirements listed by their major departments in the chapter on "Courses of Instruction." If special master's requirements are not specified in this chapter and there is a question about the prerequisite, prospective students should write directly to the appropriate director of graduate studies.

Language Requirements. The Graduate School requires no foreign language for the master's degree. Certain departments, however, do have language requirements and these must be satisfied before the master's examination can be taken. See the departmental listings in the chapter on "Courses of Instruction."

Major and Related Subjects. Thirty units of graduate credit at Duke constitutes minimum enrollment for the Master of Arts degree. The students must present acceptable grades for a minimum of 24 units of graded course work, 12 of which must be in the major subject. A minimum of 6 units of the required 24 must be in a minor subject or in related fields which are approved by the student's major department. The remaining 6 units of the required 24 may be taken either in the major or in related fields approved by the major department and the dean of the Graduate School.

Individual departments decide whether the M.A. program may be completed by submission of an approved thesis or by other academic exercises (see requirements listed in the chapter on "Courses of Instruction"). In either case, a maximum of 6 units may be earned by the completion exercises and the final examination.

Thesis Requirements. The thesis should demonstrate the student's ability to collect, arrange, interpret, and report pertinent material on a research problem. The thesis must be written in an acceptable style and should exhibit the student's competence in scholarly procedures. Requirements of form are set forth in the *Duke University Guide* for the Preparation of Theses and Dissertations, copies of which are available in the Graduate School office.

The thesis must be submitted in an approved form to the dean of the Graduate School on or before April 15 for a May degree, one week before the final day of the Duke University second summer term for a September degree, one week before the final day of the fall semester for a December degree, and at least one week before the scheduled date of the final examination. The copies of the thesis then will be distributed by the student to the several members of the examining committee. Two copies for the library and one copy for the adviser will be bound upon payment of the university binding fee of \$25.

The Examining Committee and the Examination. The department's director of graduate studies recommends an examining committee composed of three members of the graduate faculty, one of whom usually must be from a department other than the major department. If the student has been permitted to take related work within the major department, the third member may be chosen from within the department. Nominations for membership on this committee are submitted for approval to the dean of the Graduate School at least one week preceding the final examination.

The committee will conduct the examination and certify the student's success or failure by signing the card provided by the Graduate School office. This card indicates completion of all requirements for the degree. If a thesis is presented, the committee members also sign all copies of the thesis, and the candidate then returns the original and first two copies to 013 Perkins Library.

MASTER OF PUBLIC POLICY

See page 202 for a description of the M.P.P. degree.

MASTER OF SCIENCE

Prerequisites. A bachelor's degree is a prerequisite for the M.S. degree. Departments offering an M.S. degree consider for admission students from allied fields provided they have satisfactory scientific and mathematical backgrounds.

Language Requirements. There is no foreign language requirement in Master of Science degree programs.

Major and Related Subjects. Thirty units of graduate credit at Duke constitutes minimum enrollment for the Master of Science degree. The student must present acceptable grades for a minimum of 24 units of graded graduate courses. Of these, at least 12 units must be in the major subject. A minimum of 6 units must be in a minor subject or in related fields which are approved by the student's major department. The remaining 6 units of the required 24 may be taken either in the major or in related fields approved by the major department and by the dean of the Graduate School. A maximum of 6 units may be earned either by submission of an approved thesis, or by completing courses or other academic activities approved by the student's department. As other requirements vary according to department, please consult the chapter on "Courses of Instruction" for further information.

Thesis and Examination. Some departments require a thesis; all departments require an examination. The regulations and options for theses and other means of completing the program, as well as the provisions for examination and the examining committee, are the same as the requirements for the Master of Arts degree.

MASTER OF ARTS IN TEACHING

See page 232 for a description of the M.A.T. degree.

Additional Master's Regulations

Filing the Intention to Receive Degree. On or before February 1 for a May degree, on or before August 1 for a September degree, or on or before December 1 for a December degree, and at least one month prior to the final examination, the student must file in the Office of the Graduate School, on the official form, a declaration of intention to graduate. The declaration of intention presents the title of the thesis or specifies alternative academic exercises on which the degree candidate will be examined. During their final semester students may not change from a thesis program to a nonthesis program or from a nonthesis program to a thesis program after this form has been filed with the Graduate School office. The declaration must have the approval of both the director of graduate studies in the major department and the chair of the student's advisory committee.

Transfer of Credits. A maximum of 6 accredited units of graduate credit may be transferred for graduate courses completed at other schools. Such units will be transferred only if the student has received a grade of B (or its equivalent) or better. The transfer of graduate credit does not reduce the required minimum registration of 30 units for a master's degree at Duke. Requests for transfer should be submitted on the approved Graduate School form.

Nondegree Students. Credit for graduate courses taken at Duke by a student (not undergraduate) before degree admission to the Graduate School or while registered as a nondegree student through the Office of Continuing Education or the Graduate School may be carried over into a graduate degree program if (1) the action is recommended by the student's director of graduate studies and approved by the dean, (2) the amount of such credit does not exceed 12 units, (3) the work has received grades of C or better, (4) the work is not more than two years old, and (5) the student applies for and is granted formal admission into a degree program.

Time Limits for Completion of Master's Degrees. Master's degree candidates who are in residence for consecutive academic years should complete all requirements for the degree within two calendar years from the date of their first registration in the Graduate School. Candidates must complete all requirements within six calendar years of their first registration.

To be awarded a degree in May, the recording of transfer credit must be completed by the first day of the final examination period. If a thesis is one of the requirements, it must be submitted to the Graduate School office no later than April 15. Candidates desiring to have their degrees conferred on September 1 must have completed all requirements, including the recording of transfer of credit, by the final day of the Duke University summer session. Candidates completing degree requirements after that date and during the fall will have their degrees conferred on December 30.

Degree Regulations—The Doctoral Degree

Requirements. The formal requirements for the Ph.D. degree are as follows: (1) payment of 6 semesters of full-time tuition (or five if transfer credit has been approved), (2) major and related courses, (3) foreign language(s) in many departments, (4) a supervisory committee for the student's program of study, (5) residence, (6) preliminary examination, (7) dissertation, and (8) final examination.

Major and Related Work. The student's program of study demands substantial concentration on courses in the major department. However, a minimum of 2 courses in a related field approved by the major department must be included. A few programs have been authorized by the Executive Committee of the Graduate Faculty to utilize courses in fields within the major department in fulfilling the related field requirement. If there are deficiencies in a student's undergraduate program, departments may require certain undergraduate courses to be taken. In all cases the student's supervisory committee will determine if the student must meet requirements above the minimum.

Foreign Languages. The Graduate School has no foreign language requirement for the Ph.D. Some departments require two languages; other departments have no foreign language requirements. For specific departmental requirements, see the chapter on "Courses of Instruction" or contact the appropriate director of graduate studies.

Students working toward the doctoral degree in a department requiring a foreign language(s) must complete this requirement before taking the preliminary examination.

English Language Proficiency. All international Ph.D. students are subject to the requirement described on page 33 of this bulletin.

Committee to Supervise the Program of Study. As early in a student's course of study as is practicable and not later than two months before the preliminary examination, the director of graduate studies in the major department will nominate for the approval of the dean a supervising committee consisting of five members, with one member designated as chair. This committee will include at least three graduate faculty members of the major department and, usually, at least one from outside the department. For programs in which approval has been granted for related work from a clearly differentiated division within the department, one member of the committee will be chosen from that division. This committee, with all members participating, will determine a program of study and administer the preliminary examination.

Residence. The minimum residence requirement is one academic year (two consecutive semesters in the same academic year) of full-time registration at Duke (that is, two semesters of full-time tuition). Transfer of credit will not reduce the minimum requirement of one full-time academic year at Duke.

Time Limits. Ordinarily a student registered for full-time study should pass the preliminary examination by the end of the third year. A student who has not passed the examination by the end of this time must file with the dean of the Graduate School a statement, approved by the director of graduate studies in the major department,

explaining the delay and setting a date for the examination. Except under unusual circumstances, extension will not be granted beyond the middle of the fourth year.

The doctoral dissertation should be submitted and accepted within two calendar years after the preliminary examination is passed. Should the dissertation not be submitted and accepted within four years after the examination, the candidate, with the approval of the committee, may petition the dean of the Graduate School for an extension of up to one year. If this extension is granted and the dissertation is not submitted and accepted by the new deadline, the student will be dropped from candidacy. The student must then pass a second preliminary examination to be reinstated as a candidate for the degree. In such cases, the time limit for submitting the dissertation will be determined by the dean of the Graduate School and the candidate's committee.

Ordinarily, credit is not allowed for graduate courses (including transfers) or foreign language examinations that are more than six years old at the date of the preliminary examination. Similarly, credit will not be allowed for a preliminary examination that is five years old at the date of the final examination. In cases of exceptional merit, however, the dean of the Graduate School may extend these limits. Should the five-year limits be exceeded, the student's department must submit to the dean specific requirements for revalidating credits.

Preliminary Examination. A student is not accepted as a candidate for the Ph.D. degree until the preliminary examination has been passed. The examination ordinarily covers both the major field and related work, although some departments cover such field expertise in a separate qualifying examination. Please consult the chapter on "Courses of Instruction" for individual department procedures. In the summer a preliminary examination may be scheduled only between the opening and closing dates of the summer session.

A student who fails the preliminary examination may apply, with the consent of the full supervisory committee and the dean of the Graduate School, for the privilege of a second examination to be taken no earlier than three months after the date of the first. Successful completion of the second examination requires the affirmative vote of all five committee members. Failure on the second examination will render a student ineligible to continue a program for the Ph.D. degree at Duke University.

The Dissertation. The dissertation is expected to be a mature and competent piece of writing, embodying the results of significant and original research.

One month before the dissertation is presented and no later than February 1 preceding the May commencement, August 1 for a September degree, and December 1 for a December degree, the student must file with the dean of the Graduate School, on the official form available in the Graduate School office, the title of the dissertation. This title must receive the written approval of both the director of graduate studies of the student's major department and the professor who directs the dissertation.

The basic requirements for preparing the dissertation (type of paper, form, and binding) are prescribed in the *Guide for the Preparation of Theses and Dissertations*, copies of which are available in the Graduate School office.

The dissertation must be completed to the satisfaction of the professor who directs the dissertation, members of the student's advisory committee, and the dean of the Graduate School. A copy of the dissertation must be submitted to the dean of the Graduate School on or before April 1 preceding the May commencement, one week before the end of the Duke summer session for a September degree, or one week before the end of the fall semester for a December degree. The dissertation must be submitted to the Graduate School office at least seven days before the scheduled date of the student's examination.

All doctoral dissertations are published on microfilm through University Microfilms, Ann Arbor, Michigan. Authors may copyright them if they wish. Abstracts are published in *Dissertation Abstracts International*.

Two extra copies of the abstract (not more than 350 words long) are submitted when the dissertation is presented to the Graduate School office. A nonrefundable fee of \$50 is charged for microfilming. If copyright is desired, an additional fee of \$35 is charged. The original and two copies will be bound at a cost of \$25.

Final Examination. The final examination is normally administered by the five members of the supervising committee, but it may be administered by four members of the committee if the member representing the related field is present. In either case, successful completion of the final examination requires at least four affirmative votes. The final oral examination shall be primarily on the dissertation; however, questions may be asked in the candidate's major field. Except in unusual circumstances approved by the dean, a final examination will not be scheduled when the university is not in session.

A student who fails the final examination may be allowed to take it a second time, but no earlier than six months from the date of the first examination. Permission to take the second examination must be obtained from the professor who directed the dissertation and from the dean of the Graduate School. Failure to pass the second examination renders the student ineligible to continue work for the Ph.D. degree at Duke University.

Deposit of the Dissertation. After passing the examination, candidates return the original and the first two copies of the dissertation, properly signed to 013 Perkins Library. At this time they sign the microfilming agreement and pay microfilming and copyright fees.

Commencement

Graduation exercises are held once a year, in May, when degrees are conferred on and diplomas are issued to those students who have completed requirements by the end of the spring. Those who complete degree requirements by the end of the fall or by the end of a summer term receive diplomas dated December 30 or September 1, respectively. There is a delay in the mailing of September and December diplomas because diplomas cannot be issued until they are approved by the Academic Council and the Board of Trustees.

Standards of Conduct

Duke University expects and will require of all its students cooperation in developing and maintaining high standards of scholarship and conduct.

Students are expected to meet academic requirements and financial obligations, as specified elsewhere in this bulletin, in order to remain in good standing. Certain nonacademic rules and regulations must be observed also. Failure to meet these requirements may result in *summary* dismissal by the appropriate officer of the university.

The university wishes to emphasize its policy that all students are subject to the rules and regulations of the university currently in effect or which, from time to time, are put into effect by the appropriate authorities of the university. Students, in accepting admission, indicate their willingness to subscribe to and be governed by these rules and regulations and acknowledge the right of the university to take such disciplinary action, including suspension and/or expulsion, as may be deemed appropriate for failure to abide by such rules and regulations or for conduct adjudged unsatisfactory or detrimental to the university.

Duke University, as a community of scholars, strongly relies upon the standard of academic integrity. Plagiarism and other forms of academic dishonesty represent a corruption of this integrity and, as such, cannot be tolerated within the community. Ignorance of what constitutes academic dishonesty is no excuse for actions which violate the integrity of the community. In a community which builds on the notion of academic integrity, the threat of academic dishonesty represents an intolerable risk. Students

unsure about the university definition of plagiarism may wish to consult the *Bulletin of Duke University: Information and Regulations* (especially the chapter on "Academic Honesty").

Sexual Harassment Procedures. A committee of students, faculty, and administrators exists at Duke to respond to concerns about sexual intimidation in any form. For confidential assistance and information on procedures, contact Professor Nancy Hewitt (Department of History), 684-2505.

Student Grievance Procedures. It is the responsibility of the director of graduate studies to inform each graduate student of the appropriate channels of appeal. In normal circumstances, the director of graduate studies is the first to hear a complaint. If the complaint cannot be resolved satisfactorily at this level, the student may address, in turn, the department chair, the associate dean of the Graduate School, the dean of the Graduate School, the provost, and as a last resort, the president of the university.

Judicial Code and Procedures. In the spring of 1971, the Graduate School community ratified and adopted the following official judicial code and procedures:

I. Graduate School Judicial Code and Procedures

A. A student, by accepting admission to the Graduate School of Duke University, thereby indicates willingness to subscribe to and be governed by the rules and regulations of the University as currently are in effect or, from time to time, are put into effect by the appropriate authorities of the University, and indicates willingness to accept disciplinary action, if behavior is adjudged to be in violation of those rules or in some way unacceptable or detrimental to the University. However, a student's position of responsibility to the authorities and the regulations of the University in no way alters or modifies responsibilities in relation to civil authorities and laws.

B. A graduate student at Duke University stands in a primary and unique relation of responsibility to the faculty in the major department, the faculty upon whose recommendation a graduate degree will or will not be awarded to the student. In matters which involve or may affect the student's intellectual or professional life, the student is directly responsible to this department and its representatives, and such matters should primarily be handled by the department.

C. Actions which appear to conflict with University-wide rules and regulations will fall under the jurisdiction of the University Judicial Board.

D. A student may elect to have the Dean of the Graduate School hear matters related to the student's conduct in addition to or instead of faculty members from the student's major department, or may elect to have such matters reviewed and judged by a judicial board instead of the Dean of the Graduate School or members of the faculty in the major department. (The constitution and procedure of the judicial board are detailed below.)

E. The Director of Graduate Studies in the student's major department may request that a student's actions be reviewed by the Judicial Board or by the Dean of the Graduate School.

II. The Graduate School Judicial Board

A. *Composition.* The Graduate School Judicial Board shall have five members, serving for a period of two years: two students selected from the student body, two members of the Graduate Faculty appointed by the Executive Committee of the Graduate School, and one Associate or Assistant Dean appointed by the Dean of the Graduate School. The Board shall elect one of its members as Chairman. The Board shall have at its service a recording secretary to keep minutes of the hearings and of the Board's actions in a permanent, confidential record book. The Board will be constituted in order to hear cases in which the accused is a student currently enrolled in the Graduate School and which have been referred to it by the Director of Graduate Studies in the student's department, by the Dean of the Graduate School, or by the student himself.

B. *Preliminary Procedures.* If a student requests a hearing by the Judicial Board it must be done in writing, allowing its Chairman at least seventy-two hours to convene the Board. In addition, the Chairman shall not convene the Board until seventy-two hours after being asked to convene the Board. It is the responsibility of the Chairman of the Judicial Board fully to inform its members concerning the case and the reasons the case has been referred to the Board; and to prepare a written summary of this information for the Board, the Dean, and the student.

C. *Procedural Safeguards for the Hearing.* The Accused has the right to challenge any member of the Judicial Board on grounds of prejudice. If the Board decides to excuse one or more of its members for reasons given by the Accused, it shall consult with the Dean about the need for replacements. The Accused may choose an Adviser to assist in the defense. The Accused may also produce witnesses (including no more than two character witnesses), introduce documents, and offer testimony. A person having direct knowledge relevant to a case being heard by the Board is a material witness. The Judicial

Board may request the appearance of material witnesses. The Board shall also request, upon written request of the Complainant or the Accused, the appearance of material witnesses. Witnesses shall be notified of the time, place, and purpose of their appearance. The Accused has the right to examine the written statement of any witness relevant to the case at least seventy-two hours before the hearing. The Accused has the right to be faced with any witness who has given a statement relevant to the case at the hearing if the witness's attendance can be secured.

The hearing will be conducted in private unless the Accused requests an open hearing. If any objection is raised to conducting an open hearing in any particular case, the Judicial Board shall decide the issue by majority vote. If the decision is made not to hold an open hearing, the Accused shall be informed in writing of the reasons for the decision.

The Judicial Board shall consider only the report of the Chairman, documents submitted into evidence, and the testimony of witnesses at the hearing in reaching its decisions.

D. Conduct of the Hearing. The hearing of any case shall begin with a reading of the charge by the Chairman in the presence of the Accused. The Accused shall then plead guilty or not guilty or move to terminate or postpone the hearing. The Accused may qualify a plea, admitting guilt in part and denying it in part. The Accused may not be questioned for more than one hour without recess.

At any time during the hearing, the Accused or the Judicial Board may move to terminate or to postpone the hearing or to qualify the plea or to modify its charge.

Pending verdict on charges (including appeal) against the Accused, status as a student shall not be changed, nor the right to be on campus or to attend classes suspended, except that the Chancellor or Provost may impose an interim suspension upon any member of the University community who demonstrates, by conduct, that continued presence on the campus constitutes an immediate threat to the physical well-being or property of members of the University community or the property or orderly functioning of the University.

E. Sanctions and the Verdict. The Graduate School Judicial Board shall have the power to impose the following penalties: expulsion, dismissal from the University with the recommendation that the person never be readmitted; suspension, dismissal from the University and from participation in all University activities for a specified period of time, after which the student may apply for readmission; disciplinary probation, placing the student on a probationary status for a specified period of time, during which conviction for violation of any regulation may result in more serious disciplinary action; restitution, payment for all, or a portion of property damage caused during the commission of an offense. Restitution may be imposed by itself or in addition to any of the other penalties. The Judgment shall consist of a finding of guilty or not guilty of the charge and, when the Accused is found guilty, a statement of the punishment assessed. On all questions, including the verdict and the finding of guilty or not guilty, the Board shall be governed by a majority vote. The Judicial Board may decide to rehear a case in which significant new evidence can be introduced. In addition, the defendant may request an appeal.

F. Appeals. The appellant may submit to the Dean a written statement containing the grounds for appeal and arguments. In such cases, the Dean should determine if the appeal should be granted, and the Dean can hear the case, or refer it to the appropriate faculty in the student's department or to the Judicial Board.

An appeal shall be granted on the following grounds: procedural error substantially affecting the rights of the accused; incompatibility of the verdict with the evidence; excessive penalty not in accord with "current community standards;" new evidence of a character directly to affect the judgment but on which the original tribunal had refused a new hearing.

III. Amendment and Construction

This Judicial code and procedure and this constitution and procedure for the Graduate School Judicial Board may be amended at any time with due notice or publication by consent of the Dean, the Executive Committee, and the graduate students. Questions and problems not answered or anticipated by the foregoing may be resolved by the use of other existing institutions or by amendment.



Courses of Instruction



Course Enrollment

Courses numbered 200-299 are sometimes open to qualified undergraduate students who have received permission of the instructor and the director of graduate studies. Undergraduate students are not permitted in any courses above 300. Odd-numbered courses are usually offered in the fall semester, even-numbered courses in the spring semester. Double numbers separated by a hyphen indicate that credit is contingent upon completion of both courses. Double numbers separated by a comma indicate that although the course is a yearlong course, credit may be received for either course or both courses.

In each department the number 399 is reserved to designate special (individual) readings in a specified area and supervised by a regular member of the graduate staff, with credit of 1-3 units each registration, only one course per registration, and 9 units maximum in three successive registrations. The course is restricted to resident master's and doctoral programs, must have a completion exercise, and must carry a grade.

The following symbols, suffixed to course numbers, identify the small group learning experiences: *S*, seminar; *P*, preceptorial; *T*, tutorial; *D*, discussion section. The *L* suffix indicates that the course includes laboratory experience. *C-L*: denotes a course that is cross-listed or a program under which a course is listed.

Art and Art History

Associate Professor Wharton, *Chair* (112A East Duke Building); Associate Professor Powell, *Director of Graduate Studies* (111B East Duke); Professor Bruzelius;* Assistant Professors Cernuschi, Rice, Stiles, and Van Miegroet; Professors Emeriti Markman, Spencer, and Sunderland; Associate Professor of the Practice Tronzo; Adjunct Professors Lee and Mezzatesta; Adjunct Associate Professor Reents-Budet

The Department of Art and Art History offers graduate work leading to the Ph.D. degree in art history. The program, which has a strong interdisciplinary component, provides students with a thorough grounding in the formal and iconographic aspects of artworks and monuments as well as in their theoretical and historical context. Course work has been designed to prepare students for careers in art and architectural criticism, research and teaching in the academy, museum, and art gallery.

*Currently on leave.

Concurrently with their work toward a Ph.D., students may satisfy the requirements for a Certificate of Museology. Students are required to have demonstrated their ability to read German and at least one other foreign language relevant to their chosen area of research before taking their preliminary examination. For further information on the program, prospective applicants may write to the director of graduate studies.

Applicants to the program in Art History should provide a copy (not returnable) of a research paper (8-10 pages) as a writing sample.

For Seniors and Graduates

201S. Topics in Greek Art. Specific aspects of the art or architecture in the Greek world from the late Geometric to the Hellenistic periods. Subject varies from year to year. Consent of instructor required. C-L: Classical Studies 220S. 3 units. *Staff*

202S. Topics in Roman Art. Selected topics in the art and architecture of late republican and imperial Rome. Subject varies from year to year. Consent of instructor required. C-L: Classical Studies 227S. 3 units. *Staff*

216. The Art of the Counter Reformation. Religious art in Catholic Europe during and following the Council of Trent. Issues such as the rise of the new religious orders; the revival of interest in the early Church and the origins of Christian archaeology; the Church's use of art in its war against Protestantism. Considers the validity of the concept of a counter-reformation style. C-L: Medieval and Renaissance Studies. 3 units. *Rice*

233S. Topics in Early Christian and Byzantine Art. Specific conceptual, institutional, or formal problems in the art of the late antique world or of the east Roman Empire. Subject varies from year to year. Consent of instructor required. C-L: Classical Studies 230S, Medieval and Renaissance Studies, and Religion 275S. 3 units. *Wharton*

236S. Topics in Romanesque and Gothic Art and Architecture. Analysis of an individual topic. Subject varies from year to year. Consent of instructor required. C-L: Medieval and Renaissance Studies. 3 units. *Staff*

237S. Greek Painting. See C-L: Classical Studies 232S. 3 units. *Stanley*

238S. Greek Sculpture. See C-L: Classical Studies 231S. 3 units. *Younger*

243S. Topics in Netherlandish and German Art. Specific problems in northern Renaissance or baroque art such as the Antwerp workshops of the sixteenth century or a critical introduction to major artists such as Van Eyck, Bosch, Dürer, and Rubens. An analytical approach to their lives, methods, atelier procedures and followers; drawings and connoisseurship problems; cultural, literary, social, and economic context; documentary and scientific research strategies. Subject varies from year to year. Consent of instructor required. C-L: Medieval and Renaissance Studies. 3 units. *Van Miegroet*

244A, S. International Expressionism. A synchronic view of the expressionist revolution in modern aesthetic conceptions throughout Europe in the period 1905-1925, emphasizing fusions of established aesthetic modes with new technological media, and the opening up of the Western tradition to other cultures, especially African. German expressionism forms the nucleus of the course and its study is integrated with the theory and practice of Italian futurism, Anglo-American imagism and vorticism, French surrealism, and Russian rayonnism. Not open to students who have taken Art 244S or German 244S. C-L: German 244A. 3 units. *Cernuschi and Rolleston*

244B, S. International Modernism. An interdisciplinary view of the various aesthetic and literary manifestations of European modernism: cubism, imagism, futurism, vorticism, suprematism, constructivism, dadaism, expressionism, and surrealism. C-L: German 244B. 3 units. *Cernuschi and Rolleston*

247S. Topics in Italian Renaissance Art. Specific problems dealing with iconography, style, or an individual master from c. 1300 to 1600. Subject varies from year to year. Consent of instructor required. C-L: Medieval and Renaissance Studies. 3 units. *Rice*

257S. Topics in Pre-Columbian Art and Culture. Selected topics in pre-Columbian art and archaeology with an emphasis on the political and cultural context of the artifact. Subject varies from year to year. Consent of instructor required. 3 units. *Reents-Budet*

260S. Topics in Italian Baroque Art. Problems in Italian art and architecture from c. 1580 to c. 1750. Topics vary from year to year. Consent of instructor required. C-L: Medieval and Renaissance Studies. 3 units. *Rice*

265S. Topics in Nineteenth-Century Art. Focus on a major artist, movement, or trend in nineteenth-century art. Subject varies from year to year. Consent of instructor required. 3 units. *Cernuschi or Stiles*

270S. Topics in African Art. Specific problems of iconography, style, or a particular art tradition. Subject varies from year to year. Consent of instructor required. 3 units. *Powell*

271S. Topics in Art of the United States. Selected topics from colonial times to 1945, with emphasis on major cultural issues, movements, works, and/or artists. Consent of instructor required. 3 units. *Powell or Stiles*

283S. Topics in Modern Art. Selected themes in modern art before 1945, with emphasis on major movements or masters. Subject varies from year to year. Consent of instructor required. 3 units. *Cernuschi or Stiles*

291, 292. Independent Study/Special Problems in Art History. Directed reading and research. Consent of instructor required. 3 units each. *Staff*

296S. Methodology of Art History. Approaches to the study and theory of art: historiography, connoisseurship, iconology, and criticism. Consent of instructor required. 3 units. *Staff*

297S. Topics in Art since 1945. Historical and critical principles applied to present-day artists and/or movements in all media since World War II. Consent of instructor required. 3 units. *Cernuschi or Stiles*

298S. Topics in Modern and Postmodern Architecture. The study of particular architects, movements, or building genres in their conceptual and political contexts. Subject varies from year to year. Consent of instructor required. 3 units. *Wharton*

299S. Critical Theory. Understanding of the visual arts in terms of the theoretical developments in other disciplines (for example, literature, women's studies, Marxism, and anthropology). Focus on the writings of theory-centered art historians and critics. Consent of instructor required. 3 units. *Cernuschi, Stiles, or Wharton*

For Graduates

391, 392. Individual Research in Art History. Directed research and writing in areas unrepresented by regular course offerings. Consent of instructor required. 3 units each. *Staff*

393. Colloquium in the History of Art. Topics of interest to art historians in every field, including "The Question of Originality," "Implications of the Frame (or its absence)," and "Art and Economy: The Impact of the Market on Visual Production." Faculty and students participate in the forum. Consent of instructor required. 3 units. *Staff*

394. Graduate Symposium. Graduate students deliver major research papers to their peers, faculty, and interested visitors. A one-day event organized by participating graduate students, supervised by a student-faculty committee, and scheduled annually sometime in April. Consent of instructor required. 3 units. *Staff*

COURSES CURRENTLY UNSCHEDULED

205S. Greek Architecture

206S. Roman Architecture

227S. Roman Painting

Asian and African Languages and Literature

Associate Professor Wang, *Director*

Courses in the following languages are taught currently and regularly in Asian and African Languages and Literature: Arabic, Chinese, modern Hebrew, Hindi-Urdu, Japanese, Korean, and Swahili. In addition, courses in Persian are taught on an irregular basis. Some of the literature courses are taught in English translation.

For a detailed listing of course offerings, see the Asian and African Languages and Literature section in the *Bulletin of Duke University: Undergraduate Instruction*.

ASIAN AND AFRICAN LANGUAGES AND LITERATURE

299. Asian and African Languages and Literature. Graduate credit for a course in any of the following languages: Arabic, Chinese, Hebrew, Hindi, Japanese, Korean, Persian, Swahili. 3 units. *Staff*

HINDI-URDU

Courses Currently Unscheduled

200, 201. Special Studies in South Asian Languages

Biochemistry

Professor Raetz, *Chair* (255 Nanaline H. Duke); Professor Hsieh, *Director of Graduate Studies* (134 Nanaline H. Duke); Professors Bell, Bennett, Blackshear, Fridovich, Greenleaf, Hill, Kredich, Lefkowitz, Modrich, Rajagopalan, D. Richardson, J. Richardson, Siegel, Spicer, Steege, and Webster; Associate Professors Greene, B. Kaufman, and Sage; Assistant Professors Been, Beese, Casey, Fierke, Garrett, Hellinga, Hershfield, R. Kaufman, Oas, and Parker; Professors Emeriti Bernheim, Gross, Guild, and McCarty

Graduate work in the Department of Biochemistry is offered leading to the Ph.D. degree. Preparation for such graduate study may take diverse forms. Undergraduate majors in chemistry, biology, mathematics, or physics are welcome, but adequate preparation in chemistry is essential. Graduate specialization areas include protein structure and function, crystallography and NMR of macromolecules, nucleic acid structure and function, lipid biochemistry, membrane structure and function, molecular genetics, and enzyme mechanisms. The biochemistry department, in cooperation with the University Programs in Genetics and in Cell and Molecular Biology, offers biochemistry students the opportunity to pursue advanced research and study to fulfill the requirements for the Ph.D. degree related to these fields.

200. General Biochemistry. An introductory survey of fundamental aspects of biochemistry with emphasis on the structure of macromolecules, mechanism of enzyme action, metabolic pathways, biochemical genetics, and the structure and functions of

special tissues. Designed for medical students; graduate students only with consent of instructor. 4 units. *Staff*

209, 210. Independent Study. A tutorial designed for students who are interested in either a laboratory or a library project in biochemistry. Credit to be arranged. C-L: Marine Sciences. Variable credit. *Staff*

215. Genetic Mechanisms. A comprehensive treatment of molecular and classical genetic mechanisms, emphasizing gene structure and function, genetic analyses in various experimental systems, as well as the behavior of chromosomes in replication, segregation, and recombination. Prerequisite: introductory genetics. C-L: The University Program in Genetics 215. 4 units. *Neovins and staff*

219. Molecular and Cellular Bases of Differentiation. See C-L: Cell Biology 219; also C-L: Immunology 219, Microbiology 219, and Pathology 219. 3 units. *Counce and staff*

222. Structure of Biological Macromolecules. Introduction to the techniques of structure determination by X-ray crystallography and study of some biological macromolecules whose three-dimensional structures have been determined at high resolution. C-L: Molecular Biophysics 222. 2 units. *Richardson*

224. Biochemistry of Development and Differentiation. An extension of topics covered in the first semester course, Biochemistry 219. Emphasis on the control of transcription and translation of messenger RNA in mammalian cells. Studies include gene amplification, postsynthetic modifications of chromosomal proteins, as a result of hormone induction. Specific systems will include the development of the mammary gland, the pancreas, and the chick oviduct. 2 units. *McCarty*

227. Introductory Biochemistry I: Intermediary Metabolism. Chemistry of the constituents of proteins, lipids, carbohydrates, and nucleic acids and their metabolic interrelationships. Prerequisite: organic chemistry. 3 units. *Hill and staff*

228. Introductory Biochemistry II. Structure, function, and biosynthesis of biological macromolecules and regulation of their synthesis. Intermediary metabolism and metabolic utilization of energy. Biochemistry of biological membranes, receptors, and signal transduction via membrane receptors. Prerequisites: organic chemistry and Biochemistry 227. 3 units. *Webster and staff*

232. Extracellular Matrix and Cell Adhesion. See C-L: Cell Biology 232. 2 units. *Bennett and Erickson*

259. Molecular Biology I: Proteins and Enzymes. Prerequisite: introductory biochemistry or consent of instructor. See C-L: Cell and Molecular Biology 259; also C-L: Cell Biology 259, Immunology 259, Microbiology 259, and Molecular Biophysics 259. 3 units. *Richardson and staff*

265S, 266S. Seminar. Topics and instructors announced each semester. 2 units or variable. Variable credit. *Staff*

268. Molecular Biology II: Nucleic Acids. Biochemistry of nucleic acids, with emphasis on their chemistry, structure, metabolism, and biological function in information transfer. Prerequisites: introductory biochemistry and BCH/CMB/CBI/IMM/MIC 259, or consent of instructor. C-L: Cell and Molecular Biology 268, Cell Biology 268, Immunology 268, Microbiology 268, and The University Program in Genetics. 4 units. *Steege and staff*

288. The Carbohydrates and Lipids of Biological Systems. The subjects will be considered in the following two general categories: (a) the relationship between chem-

ical structure and biological function, and (b) biosynthesis and catabolism. 2 units. *Kaufman*

291. Physical Biochemistry. Basic principles of physical chemistry as applied to biological systems. Topics include thermodynamics, kinetics, statistical mechanics, spectroscopy, and diffraction theory. Concepts discussed in the context of the biochemistry and behavior of biological macromolecules. Emphasis on quantitative understanding of biochemical phenomena, with extensive problem solving as an instructive tool. Prerequisites: undergraduate physical chemistry and one year of calculus. C-L: Molecular Biophysics 291. 3 units. *Oas and staff*

320. Cell Differentiation in Development and Disease. Introduction to the organization of the eukaryotic genome provided by recent technical advances in genetics and the use of recombinant DNA probes. Consideration of chromosome activation, gene amplification, and the impact of nucleocytoplasmic interactions on the regulation of differentiation. Transition phases of cell cycle discussed in regard to normal and oncogene function. Conferences devoted to specific examples dealing with critical aspects of differentiation in development of normal and disease states. 2 units. *Counce, Kaufman, and McCarty*

321. Hormone and Tissue Interactions in Differentiation and Disease. Hormones and other biochemical signals in regulation of the differentiated state including amino acids, polypeptide and steroid hormone response in insects, snails, and higher vertebrates discussed in terms of biotechnology used to elucidate mechanisms of information transfer and gene control at the chromatin level. Cell-cell, cell-matrix, and hormonal interactions considered as control elements in development and differentiation. Interactions involving cell surface, basal lamina, and extracellular matrix discussed in terms of differentiation of limb bud/pancreas/lymphocyte/and neural tissue. Conferences include hormone control of sex differentiation, ectopic hormone biosynthesis, and endocrine related diseases. 2 units. *Kaufman and K. McCarty, Sr.*

345, 346. Biochemistry Seminar. Required of all biochemistry students. Credit/no credit. 1 unit each. *Oas*

417. Cellular Signaling. See C-L: Cell Biology 417; also C-L: Pharmacology 417. 3 units. *Bell, Caron, Casey, Means, and invited lecturers*

COURSES CURRENTLY UNSCHEDULED

245L. Macromolecules, Ecology, and Evolution

276. Comparative and Evolutionary Biochemistry

286. Current Topics in Immunology

296. Biological Oxidations

297. Intermediary Metabolism

299. Nutrition

Biological Anthropology and Anatomy

Professor Kay, *Chair and Director of Graduate Studies* (267 Sands); Professors Cartmill, Glander, Hylander, Simons, and Terborgh; Associate Professors Roth, Smith, and Van Schaik; Assistant Professors Bassett, Maas, Pope, and White; Professor Emeritus LaBarre; Associate Professor Emeritus Duke; Adjunct Associate Professor Wright

Students will be accepted for the Ph.D. degree. Admission to the program is not contingent on any particular course of study at the undergraduate level. The goal of the

graduate program in biological anthropology and anatomy is to provide students with a broad-based background in organismal biology with which to study the behavior, ecology, and evolution of primates. The three general areas of specialization in the department are: (1) behavior, ecology, and genetics; (2) paleontology, systematics, and evolution; and (3) functional, comparative, and developmental morphology. Students are encouraged to define a course of study that crosses these boundaries and that extends beyond the strict limits of primatology. Research opportunities include behavioral research at the Duke University Primate Center; ecological and behavioral fieldwork in Africa, South America, Asia, and Madagascar; paleontological fieldwork in Africa, South America, North America, and Madagascar; and laboratories in experimental functional morphology and comparative embryology.

Courses of study are tailored to meet individual needs, but all students will be expected to take gross human anatomy, a course in statistics and experimental design, and at least one course in each of the subfields of the department. Students are required to demonstrate a reading knowledge of at least one language other than English. Further details are available in the *Guide to the Graduate Program in Biological Anthropology and Anatomy*, available from the director of graduate studies.

238. Functional and Evolutionary Morphology of Primates. History and functional significance of locomotor and feeding adaptations, craniofacial morphology, sense organs, and reproductive systems in primates, including *Homo sapiens*. Consent of instructor required. 3 units. *Cartmill, Kay, or staff*

244L, S. Comparative Primate Ecology. Comparisons of the evolutionary ecology of prosimians, monkeys, and apes. With field methods. Prerequisites: Biological Anthropology and Anatomy 93 and 143 recommended. 3 units. *Glander or White*

245S. Primate Social Evolution. Ecological determinants of, and biological constraints on, social strategies and systems. Emphasis on primates. Prerequisites: Biological Anthropology and Anatomy 93; 143, 144L, or 146; or consent of instructor. 3 units. *Van Schaik*

246. The Primate Fossil Record. A survey of fossil primates including early humans. The diversity, anatomy, and behavior of primates as related to the origin and spread of past primates. The radiation of each main group of primates in the succession leading to humans illustrated with slides, casts, and fossils. Topics include geochemical dating, timing of molecular clocks, and various procedures for classifying primates. 3 units. *Simons*

247. The Hominid Fossil Record. Origin and successive stages of development of human ancestors. Detailed analysis of adaptive types and cultural developments. Personalities and current controversies in the study of hominid paleontology. Prerequisites: Biological Anthropology and Anatomy 93, 132, or consent of instructor. 3 units. *Simons*

248S. Evolution of Mammals. The origin, adaptive radiation, and phylogenetic relationships of mammals, as inferred from the fossil record. Consent of instructor required. 3 units. *Maas*

249S. Social Behavior and Evolutionary Change. The influence of social structure on rate and direction of evolutionary change, including speciation, with emphasis on primate social systems. Mating systems, dispersal patterns, and mechanisms of new social group formation examined from the perspective of their effects on the genetic structure of populations, and species radiations. Prerequisites: Biological Anthropology and Anatomy 143, or 144, or 146. 3 units. *Pope*

250. Biometry. A practically oriented overview of the statistical analysis of biological data. Topics include data collection and experimental design, methods and techniques

of data organization, use of computing programs and packages, applications of appropriate parametric and nonparametric statistical techniques, assumptions and problems encountered with biological data analysis, and interpretation of results. Prerequisite: Mathematics 136, Psychology 117, Sociology 133, Statistics 10D, 110, 112, 114, 213, or equivalent. C-L: Environment 253. 3 units. *Gerhart and White*

280S, 281S. Seminar in Selected Topics. Special topics in methodology, theory, or area. Consent of instructor required. 3 units each. *Staff*

287S. Macroevolution. Evolutionary patterns and processes at and above the species level; species concepts, speciation, diversification, extinction, ontogeny and phylogeny, rates of evolution, and alternative explanations for adaptation and evolutionary trends. Prerequisites: Biology 21L and 22L or equivalents. C-L: Botany 287S and Zoology 287S. 3 units. *Roth*

290. Pattern and Process in Vertebrate Development. Research results on developmental processes applied to classic problems of comparative vertebrate biology. Specific focus to vary, but to include cell differentiation and migration, induction, cell-cell interaction and cell mechanics as well as craniofacial morphogenesis, development and evolution, developmental constraints and comparative embryology. Prerequisites: course in comparative or human anatomy and consent of instructor. C-L: Zoology 290. 3 units. *Smith*

292S. Topics in Morphology and Evolution. Various aspects of vertebrate morphology and evolution, including major historical approaches to the interpretation of morphology; the evolution, development, and function of specific morphological structures; and patterns of vertebrate evolution. Consent of instructor required. 3 units. *Smith*

301. Anatomy of the Limbs. The musculoskeletal anatomy of the limbs and limb girdles. Emphasis is on detailed dissection of the extremities, with a minor focus on clinical applications. Course primarily intended for advanced graduate students in physical therapy. Consent of instructor required. 1 to 3 units. Variable credit. *Staff*

305. Gross Human Anatomy. Includes complete dissection of a cadaver; laboratory work is supplemented by conferences which emphasize biological and evolutionary aspects. Required of entering graduate students in anatomy; by arrangement, may extend into second semester. Prerequisites: adequate background in biology, including comparative anatomy and embryology and written consent of instructor. 3 units. *Staff*

312. Research. Individual investigations in the various fields of biological anthropology and anatomy. Consent of instructor required. Credit to be arranged; maximum 6 units. Variable credit. *Staff*

313. Anatomy Seminar. Regular meeting of graduate students and staff in which current research problems in anatomy will be presented. 1 unit. *Staff*

314. Biological Anthropology Seminar. Regular meeting of graduate students and staff in which current research problems in biological anthropology will be presented. 1 unit. *Staff*

334. Topics in Physical Anthropology. 3 units. *Staff*

340. Tutorial in Advanced Anatomy. Topics for intensive reading and discussion will be chosen according to the student's interests, related to basic problems in function of bone and muscle systems, development and differentiation, comparative anatomy at the gross and histological level and vertebrate evolution. Consent of instructor required. Variable credit. *Staff*

354. Research in Biological Anthropology and Anatomy. A preceptorial course in various research methods in biological anthropology and anatomy. Consent of instructor required. Credit to be arranged. Variable credit. *Staff*

393. Independent Study. Directed reading and research. Consent of instructor required. 3 units. *Staff*

COURSES CURRENTLY UNSCHEDULED

293, 294. Evolutionary Theory

Botany

Professor Searles, *Chair* (149 Biological Sciences); Professor Strain, *Director of Graduate Studies* (134 Biological Sciences); Professors Antonovics, Barber, Boynton, Christensen, W. Culberson, Ramus, Reynolds, Schlesinger, Siedow, Stone, Terborgh, White, and Wilbur; Associate Professors Knoerr and Vilgalys; Assistant Professors Baldwin, Clark, Dong, Kohorn, and Sun; Professors Emeriti Anderson, Billings, Hellmers, Kramer, Naylor, and Philpott; Research Professors C. Culberson and Patterson; Associate Research Professor Harris; Adjunct Professor Osmond; Adjunct Associate Professors Funk, Kress, Lacey, Mishler, Wagner, and Zimmer; Adjunct Assistant Professor McDade

Graduate work in the Department of Botany is offered leading to the A.M. (nonthesis), M.S. (thesis), and Ph.D. degrees, although applicants declaring terminal master's objectives are not admitted to the program. Students entering the graduate program in botany normally have a broad background in the botanical or biological sciences supplemented with basic courses in chemistry, mathematics, and physics. Biochemistry and physical chemistry are strongly recommended for students interested in molecular areas, and advanced courses in mathematics are recommended for students in population genetics and ecology. Deficiencies may be corrected by taking appropriate courses during the first year of graduate study. Students in botany may specialize in a wide variety of areas including anatomy; cellular and molecular biology; evolution; developmental, ecological, molecular, organelle, and population genetics; physiology; community, ecosystem, physiological, and population ecology; marine biology; and the systematics of algae, fungi, lichens, bryophytes, ferns, and flowering plants. Students' programs are tailored to individual needs. A brochure providing detailed information on the botany department is available from the director of graduate studies.

209L. Lichenology. Morphology, systematics, and biological and ecological implications of the lichens. Collection and identification of specimens and the use of lichen chemistry in taxonomy. 3 units. *C. Culberson and W. Culberson*

212L, S. Phycology. Morphological and ecological characteristics of common freshwater and marine algae and principles of their classification. 3 units. *Searles*

215. Tropical Ecology. Ecosystem, community, and population ecology of tropical plants and animals with application to conservation and sustainable development. **Prerequisite:** a course in general ecology. C-L: Environment 217 and Zoology 215. 3 units. *Terborgh*

218L. Barrier Island Ecology. An integration of barrier island plant and animal ecology within the context of geomorphological change and human disturbance. Topics include: barrier island formation and migration, plant and animal adaptations, species interactions, dune succession, maritime forests, salt marshes, sea level rise, conservation policy, and restoration ecology. Field trips to many of the major North Carolina barrier islands. Strong emphasis on field observation and independent research. (Given at Beaufort.) **Prerequisite:** introductory biology; suggested: course in botany or ecology.

C-L: Environment 218L and Marine Sciences. 6 units. *Evans, Peterson, and Wells (visiting summer faculty)*

220L. Mycology. Survey of the major groups of fungi with emphasis on life history and systematics. Field and laboratory exercises. 3 units. *Vilgalys*

224T, 225T. Special Problems. Students with adequate training may do special work in the fields listed below. Credit to be arranged. 1 to 4 units. Variable credit.

2. Genetics. *Antonovics*
3. Genetics. *Boynton*
4. Ecology. *Christensen*
5. Ecology. *Clark*
6. Lichenology. *W. Culberson*
13. Cell Biology. *Kohorn*
18. Bryology and Systematics. *Mishler*
24. Phycology. *Ramus*
29. Ecology. *Schlesinger*
30. Phycology. *Searles*
31. Physiology. *Siedow*
33. Systematics of Flowering Plants. *Stone*
34. Ecology. *Strain*
38. Mycology and Molecular Systematics. *Vilgalys*
42. Anatomy and Morphology of Vascular Plants. *White*
44. Systematics of Vascular Plants. *Wilbur*
53. Tropical Ecology and Conservation. *Terborgh*
54. Marine Ecology. *Barber*
55. Ecology. *Reynolds*
57. Systematic Botany. *Baldwin*
58. Plant Molecular Biology. *Dong*
60. Plant Molecular Biology. *Sun*

229L, S. Paleoeology. Global change over the last two million years. Prerequisites: two semesters of biology or geology; and one semester each of calculus, chemistry, and physics; or consent of instructors. C-L: Zoology 229L. 3 units. *Bush, Clark, and Livingstone*

232. Microclimatology. See C-L: Environment 232. 3 units. *Knoerr*

234S. Problems in the Philosophy of Biology. Consent of instructor required. See C-L: Philosophy 234S; also C-L: Zoology 234S. 3 units. *Brandon*

237L. Systematic Biology. Theory and practice of identification, species discovery, phylogeny reconstruction, classification, and nomenclature. Prerequisites: Biology 21L and 22L or equivalents. C-L: Zoology 237L. 3 units. *Baldwin (botany)*

241. Field Botany. Identification and recognition of the vascular flora of the Carolinas. Frequent field trips to representative habitats. Prerequisite: introductory plant identification course or consent of instructor. 3 units. *R. Wilbur*

243L. Evolution and Classification of Angiosperms. Characteristics and phylogenetic relationships of major flowering plant lineages. Emphasis on current literature, rigorous methods, modern controversies, and biological and biogeographic implications of relationships. Prerequisite: Biology 142L or equivalent. 3 units. *Baldwin, Funk, Kress, and Wagner*

257L. Molecular Systematics and Evolution. Descriptive and experimental procedures used to assess evolutionary diversity for analysis of population genetics and systematic relationships. Laboratory problems, discussion, and individual research projects. Prerequisites: basic course work in systematics, evolution, and genetics. 3 units. *Vilgalys*

261. Photosynthesis. Principles of photosynthesis: developmental, mechanistic, regulatory, and ecological aspects of the photosynthetic process. Prerequisite: Biology 152 or Botany 252 or equivalent. 3 units. *Siedow*

265L. Physiological Plant Ecology. The physiological approach to interpreting adaptation in plants, with emphasis on terrestrial seed plants. Prerequisites: Biology 110L and 152 or equivalents. 3 units. *Strain*

267L. Community Ecology. Mechanisms that determine the distribution and abundance of plants and animals: geology, climate, physiography, soils, competition, predation, and history. Lectures focus on ecological principles. Seminars and weekend field trips. Prerequisites: an introductory ecology course and consent of instructor. C-L: Zoology 267L. 3 units. *Clark*

269. Advanced Cell Biology. Prerequisite: introductory cell biology or consent of instructor. See C-L: Zoology 269; also C-L: Cell and Molecular Biology 269, Cell Biology 269, Immunology 269, and Microbiology 269. 3 units. *Siedow and staff*

272. Biogeochemistry. Processes controlling the circulation of carbon and biochemical elements in natural ecosystems and at the global level, with emphasis on soil and surficial processes. Prerequisite: Chemistry 12L or equivalent. C-L: Geology 272. 3 units. *Schlesinger*

283. Molecular Genetics of Organelles. Genetics, biochemistry, and molecular biology of the organelles of eukaryotic cells, and cellular symbionts. Emphasis on recent literature. Prerequisite: introductory genetics. C-L: The University Program in Genetics and Zoology 283. 3 units. *Boynton and Gillham (zoology)*

285S. Ecological Genetics. Interaction of genetics and ecology and its importance in explaining the evolution, diversity, and distribution of plants and animals. Prerequisites: Biology 180 and Botany 286 or equivalents. C-L: The University Program in Genetics. 3 units. *Antonovics*

286. Evolutionary Mechanisms. Population ecology and population genetics of plants and animals. Fitness concepts, life history evolution, mating systems, genetic divergence, and causes and maintenance of genetic diversity. Prerequisites: Biology 21L and 22L, and Biology 180 or equivalents. C-L: The University Program in Genetics and Zoology 286. 3 units. *Antonovics, Rausher, and Uyenoyama (zoology)*

287S. Macroevolution. Evolutionary patterns and processes at and above the species level; species concepts, speciation, diversification, extinction, ontogeny and phylogeny, rates of evolution, and alternative explanations for adaptation and evolutionary trends. Prerequisites: Biology 21L and 22L or equivalents. C-L: Biological Anthropology and Anatomy 287S and Zoology 287S. 3 units. *Roth (zoology)*

295S, 296S. Seminar. Credit to be arranged. Variable credit. *Staff*

300. Tropical Biology: An Ecological Approach. Highly intensive, field-oriented course conducted in Costa Rica under auspices of the Organization for Tropical Studies. For additional information refer to the chapter "Special and Cooperative Programs." 6 to 8 units. Variable credit. *Staff*

305S, 306S. Plant Systematics Seminar. Weekly presentation of current research in plant systematics by students, faculty, and invited speakers. 1 unit each. *Vilgalys*

310S, 311S. Plant Ecology Seminar. Discussion of current research and literature. 1 unit each. *Staff*

315S, 316S. Population Genetics Seminar. Discussion of recent developments in population genetics. Topics include population dynamics, forces affecting gene frequency change, molecular evolution, philosophy of evolutionary biology. Student presentations are integral to the course. 1 unit each. *Antonovics*

320S, 321S. Systematics Discussion Group. An informal discussion group. Topics vary from semester to semester; cover systematic and evolutionary biology in the broad sense. 1 unit each. *Staff*

325S, 326S. Developmental, Cellular, and Molecular Biology Seminar. Weekly presentations in developmental, cellular, and molecular biology topics by students, faculty, and invited speakers. Consent of instructor required. 1 unit each. *Staff*

330L. Environmental Monitoring and Instrumentation. Methods of measuring and monitoring the earth's physical environment with emphasis on water and air resources. Characteristics and uses of contemporary sensors, measurement and data acquisition systems. Methods of obtaining and processing computer compatible data records. Includes laboratory. Offered on demand. C-L: Environment 330L. 4 units. *Knoerr*

359, 360. Research in Botany. Individual investigation in the various fields of botany. Credit to be arranged. C-L: Marine Sciences. Variable credit. *All members of the graduate staff*

399. Special Readings. Directed readings in advanced topics. Consent of instructor required. Credit to be arranged. Variable credit. *All members of the graduate staff*

COURSES CURRENTLY UNSCHEDULED

210L. Bryology

219L. Benthic Marine Algae

247L. Plant Ecology

256L, S. Plant Biosystematics

344. Micrometeorology and Biometeorology Seminar

RELATED PROGRAMS

The University Program in Cell and Molecular Biology. Cell and molecular biology courses offered by the botany department are an integral part of this interdepartmental program. Refer to the announcement in this bulletin under Cell and Molecular Biology for descriptions of the following courses: 259. Molecular Biology I: Proteins and Enzymes, and 264. Cell and Molecular Biology Seminar.

The University Program in Genetics. Genetics courses offered by the botany department are an integral part of this interdepartmental program. Refer to the announcement in this bulletin under the University Program in Genetics for more information.

The University Program in Marine Sciences. Interdisciplinary programs emphasizing marine botany are available. Refer to the section on the University Program in Marine Sciences.

Program in Integrative Biology. This interdisciplinary program provides selected graduate students with an academic and research environment in which they are encouraged to think broadly and synthetically about problems in biology.

Program in Tropical Biology. Fellowships are available for travel and subsistence in field-oriented programs in Central America. Refer to the section on Organization for Tropical Studies in the chapter "Special and Cooperative Programs."

Business Administration

Professor Keller, *Chair* (219W Fuqua School of Business); Professor Bettman, *Director of Graduate Studies* (429E Fuqua School of Business); Professors R. Ashton, Baligh, Burton, Fischer, Forsyth, Huber, Laughhunn, Lewin, Magat, Payne, Sheppard, Staelin, Whaley,

and Winkler; Associate Professors Anton, A. Ashton, Beneish, Boulding, Edell, Harvey, Haveman, Hsieh, Kouvelis, Linville, Maines, Mazzola, McCann, McCardle, M. Moore, M. C. Moore, Nau, Purohit, Rummel, T. Smith, and Viswanathan; Assistant Professors Bansal, Carmon, Delgado, Friedman, Johnson, Muthuswamy, Nandakumar, Ndilikilikisha, Salk, J. Smith, Sondak, and Wallace; Professor Emeritus Cohen; Research Professors Breeden and Dumas

The Ph.D. in Business Administration program prepares candidates for research and teaching careers at leading educational institutions and for careers in business and governmental organizations where advanced research and analytical capabilities are required. The Ph.D. program places major emphasis on independent inquiry, on the development of competence in research methodology, and on the communication of research results. The student and his/her faculty committee determine the specific program of study. Each student takes a comprehensive examination at the end of the second year or at the beginning of the third year of residence. The final requirement is the presentation of a dissertation. The Ph.D. program usually requires four years of work. Refer to the Bulletin of Duke University: The Fuqua School of Business for a complete list of courses and course descriptions.

510. Bayesian Inference and Decision. Methods of Bayesian inference and statistical decision theory, with emphasis on the general approach of modeling inferential and decision-making problems as well as the development of specific procedures for certain classes of problems. Topics include subjective probability, Bayesian inference and prediction, natural-conjugate families of distributions, Bayesian analysis for various processes, Bayesian estimation and hypothesis testing, comparisons with classical methods, decision-making criteria, utility theory, value of information, and sequential decision making. C-L: Statistics 221. 3 units. *Winkler*

513. Choice Theory. This seminar deals with the topics of measurement theory, conjoint measurement, expected utility and subjective expected utility theory, multi-attribute utility theory and recent advances in preference modeling (generalized non-linear utility theories). The goal of this seminar is to equip students with tools so that they can use preference modeling in a wide variety of social science applications. C-L: Statistics 234. 3 units. *Staff*

521. Organization Seminar: A Micro Focus. Individual and small group behavior in organizations. Theories of motivation, decision making, interpersonal behavior, group processes, and leadership. A variety of research approaches and methods includes presentation of behavioral research by members of the Fuqua School of Business and other researchers. 3 units. *Staff*

522. Organization Seminar: A Macro Focus. The organization and the subunits which make up the organization. Theories of organization, structure, decentralization, divisionalization, functional area integration, task design, incentives and rewards, information systems, and decision rules are developed with an orientation toward their choice and design for high performance. Includes presentation of research by members of the Fuqua School of Business and other researchers. 3 units. *Staff*

525. Behavioral Decision Theory. Examines the development of research in individual and group decision behavior. Major emphasis is given to theoretical developments and empirical research, with a range of articles assigned for each topic. The basic topic areas include (1) decision problem structuring, (2) thinking about uncertainties, (3) risk taking, (4) dealing with conflicting values, and (5) combining individual judgments into a group decision. C-L: Psychology: Experimental 316, Psychology: Social and Health Sciences 316, and Statistics 231. 3 units. *Payne*

531. Financial Accounting Seminar. The nature of published financial statement information and its relationship with various economic variables. The list of related variables might include stock market data, bankruptcy filings, and the actions of various users of financial statement information, including management, investors, creditors, and regulators. The focus is on the current research methodologies and research efforts used to analyze the above relationships. A background in masters-level accounting and finance is assumed. 3 units. *Staff*

532. Management Accounting Seminar. Information systems and their use in facilitating management decision making and organizational control. Emphasis on the appropriate research methodologies and paradigms including information economics, decision theory, and organizational theory. Topics include budgeting, incentive systems/performance evaluation, variance investigation, and cost allocation. 3 units. *Staff*

551. Corporate Finance Seminar. Introduction to research areas in corporate finance. Emphasis on the research interests of the instructor, and one of the following topics to be explored in depth: capital budgeting, capital structure, mergers and acquisitions, international finance, and cash management. 3 units. *Staff*

552. Investment Seminar. Survey of research in the investment area and exploration in depth of one or more problems in which research is currently active. Emphasis determined by the instructor from one or more of the following areas: valuation of risky securities, capital asset pricing model and extensions, capital market efficiency, portfolio theory, options and warrants, investment management, and futures contracts. 3 units. *Staff*

553. Portfolio Theory and Asset Pricing. This course mathematically derives well-known results in portfolio theory and asset-pricing models in finance. Topics to be covered include: single-period mean-variance efficient portfolios and the CAPM; pareto optimal allocations; multiperiod and continuous-time optimal consumption and portfolio rules; intertemporal asset-pricing model; arbitrage pricing theory; the term structure of interest rates and inflation risk; allocational roles of futures and options; and pricing and hedging results. Basic mathematics background in calculus, statistics, matrix algebra, optimization and dynamic programming is required. 3 units. *Staff*

561. Seminar in Quantitative Research in Marketing. An overview of the quantitative techniques which are important in marketing research. Each model and technique will be examined in considerable detail so as to permit an understanding of its assumptions, structure, and usefulness. Topics covered will include the general data analysis techniques as well as models from advertising, new products, and pricing decisions. 3 units. *Staff*

562. Seminar in Consumer Behavior. Examines the development of research in consumer behavior. Major emphasis is given to theoretical developments and empirical research, with a range of articles assigned for each topic. Topics include motivation and personality, perceptual processes, information search, choice processes, attitudes and persuasion, learning, and influence in consumer choice. C-L: Psychology: Experimental 315 and Psychology: Social and Health Sciences 315. 3 units. *Bettman*

563. Marketing Models Seminar. The primary goals of this seminar are (a) to critically review the most current research in marketing and (b) to gain a better understanding of and ability to build one's own model. After taking this course, students should be able to understand the assumptions and mathematical development of the current quantitative work in marketing and to use this understanding to develop meaningful extensions. 3 units. *Staelin*

564. Experimental Design and Analysis Seminar. Examines issues in the design and analysis of experiments. Emphasis on analysis of variance (ANOVA), starting with

the basic ANOVA model and examining multiple factor designs, blocking designs, nested models, within subject designs, repeated measure designs, and analysis of covariance. 3 units. *Edell*

571. Operations Strategy Seminar. Recent developments in the strategy of operations in both the manufacturing and service sectors. Topics include the focused factory concept, Japanese manufacturing philosophy, technological policy toward new process development and toward new product introduction, vertical integration, choice of capacity and location, industry analysis, and the impact of government regulation. Emphasis on the development of hypotheses about strategic topics and the empirical means by which they can be tested. 3 units. *Staff*

572. Seminar in Operational and Technological Tactics. Current issues in the day-to-day management of manufacturing and service delivery systems. Topics include material requirements planning, capacity requirements planning, quality of work life projects, productivity measurement and enhancement, implementation of new product introductions and production process modifications, quality assurance, production planning and scheduling, and logistics. Concentration on the substance of recent developments, the generation and test of hypotheses about tactical issues, and the applicability of various optimization techniques to the advance of operation tactics. 3 units. *Staff*

591. Selected Topics in Business. Allows the doctoral student the opportunity to study special topics in management on an occasional basis depending on the availability and interests of students and faculty. 3 units. *Staff*

597. Dissertation Research. For students actively pursuing research on their dissertation. Credit to be arranged. Prerequisites: student must have passed the preliminary examination and have the consent of the director of the doctoral program and instructor. Variable credit. *Staff*

598. Independent Study. Allows the doctoral student the opportunity to engage in study or tutorial on special topics on an individual basis under the supervision of a faculty member. Credit to be arranged. Prerequisites: doctoral program standing and consent of the director of the doctoral program and instructor. Variable credit. *Staff*

599. Directed Research. Allows the doctoral student to engage in individual research projects under the supervision of a faculty member. Credit to be arranged. Prerequisites: doctoral program standing and consent of the director of the doctoral program and instructor. Variable credit. *Staff*

The University Program in Cell and Molecular Biology

Program Administration: Professor McClay, *Director* (zoology); Assistant Professor Salvesen, *Associate Director* (pathology); Professors Caron (cell biology), Joklik (microbiology), Siedow (botany), and Webster (biochemistry); Associate Professors Kuhn (pharmacology) and Skene (neurobiology); Assistant Professor Doyle (immunology)

Faculty: A complete list of faculty, including research interests, will be made available to prospective students.

Research training in cell, developmental, and molecular biology is found in nine departments/programs at Duke University: biochemistry, botany, cell biology, genetics, immunology, microbiology, molecular cancer biology, neurobiology, pathology, pharmacology, and zoology. To effectively utilize this broad spectrum of expertise for the training of promising scientists while still providing a coherent curriculum, the Duke University Program in Cell and Molecular Biology has been established.

During the first year of doctoral study a student will complete the program's three-course sequence presenting current understanding and research activities in cell biology and the molecular biology of nucleic acids, proteins, and membranes.

Each student will also choose elective courses in an area of specialization. Research training is stressed throughout the program and dissertation research usually begins by the third semester. Prospective students may apply directly to the Cell and Molecular Biology Program or to one of the eleven participating departments/programs. Applicants must have demonstrated, in addition to overall academic excellence, a proficiency in the biological and physical sciences. Applications for admission and fellowship support must be received by December 31, but early applications may receive advanced consideration.

251. Molecular Cell Biology. Current research topics in cell biology presented in a lecture and discussion format based on recent research papers. Topics include: protein secretion and trafficking; mitochondria and organelles; the nucleus; cytoskeleton and cell motility; extracellular matrix and cell adhesion; growth factors and signalling; cell cycle. C-L: Cell Biology 251. 4 units. *Erickson and staff*

259. Molecular Biology I: Proteins and Enzymes. Detailed concepts of the structure and function of proteins as enzymes and as structural elements of cellular substructures, including: protein primary structure and its determination, patterns of protein folding, mechanisms of enzyme catalysis and regulation, function and formation of multimeric protein assemblies, kinetics of enzyme reactions. Prerequisite: introductory biochemistry or consent of instructor. C-L: Biochemistry 259, Cell Biology 259, Immunology 259, and Microbiology 259. 3 units. *Richardson and staff*

264. Cell and Molecular Biology Colloquium. Required of all students. Third- and fourth-year students discuss their dissertation research. 1 unit. *Kreuzer*

268. Molecular Biology II: Nucleic Acids. Biochemistry of nucleic acids, with emphasis on their chemistry, structure, metabolism, and biological function in information transfer. Prerequisites: introductory biochemistry and BCH/CMB/CBI/IMM/MIC 259, or consent of instructor. C-L: Biochemistry 268, Cell Biology 268, Immunology 268, Microbiology 268, and The University Program in Genetics. 4 units. *Steege and staff*

269. Advanced Cell Biology. Structural and functional organization of cells and their components with emphasis on current research problems and prospects. Prerequisite: introductory cell biology or consent of designated instructor. C-L: Botany 269, Cell Biology 269, Immunology 269, Microbiology 269, and Zoology 269. 3 units. *Siedow and staff*

Cell Biology

Professor Sheetz, *Chair*; Professor Erickson, *Director of Graduate Studies*; Professors Blum, C. Bonaventura, J. Bonaventura, Caron, Counce, Gutknecht, Hatchell, Jöbssis, Johnson, Lieberman, Mandel, McIntosh, McManus, Nicklas, Padilla, Plonsey, Reedy, Somjen, Sommer, and Spach; Associate Professors Akwari, N. Anderson, Bennett, Cobb, Corless, Greenfield, Kiehart, Mills, Schachat, Schomberg, Vigna, and Wright; Assistant Professors P. Anderson, Argon, Benjamin, Capel, Cohn, Davis, DeLozanne, Dittman, Drezner, Freemark, Garrett, Hannun, Iglehart, Kraus, Lightner, Meyer, Nicchitta, O'Halloran, Saling, Swenson, and Titus; Professor Emeritus Moses; Associate Medical Research Professors Aitken, LeFurgey, and K. Taylor; Assistant Medical Research Professors Chang, Klitzman, Lobaugh, Miller, and O'Brien; Adjunct Professor Rodbell

The Department of Cell Biology offers graduate training in modern cell biology and physiology leading to the Ph.D. degree.

Specific research interests include: cytoskeleton and cell motility, including both actin and microtubule based motors, mechanisms of contraction, vesicle transport and chromosome movement; cardiac and skeletal muscle, including ultrastructure, physiology, developmental and molecular biology; cell adhesion and biophysics of membrane

interactions; extracellular matrix; protein secretion and trafficking mechanisms; transmembrane receptors and molecular mechanisms of signal transduction; cell physiology, metabolism, and membrane transport in brain, kidney, muscle; vertebrate photoreceptors; high resolution electron microscopy and computer image processing.

The department has excellent facilities for light and electron microscopy; computer image processing, analysis and 3-D reconstruction; X-ray diffraction; cell culture and micromanipulation; and modern biochemistry and molecular biology. The Department of Cell Biology also participates in several university-wide interdisciplinary training programs, including genetics, cell and molecular biology, neurobiology, pharmacology, biomedical engineering, and toxicology.

The Division of Physiology, which is centered in the Department of Cell Biology, brings together faculty and students with interests in cellular, organ, and systemic physiology. The program of graduate studies in physiology is organized through this division. For further information, contact the director of graduate studies.

200. Cell and Tissue Biology. Lectures on the structure and function of the cells and tissues of the body. The laboratory provides practical experience with light microscopy studying and analyzing our extensive slide collection of mammalian tissues. Designed for medical students; graduate students may take this course with consent of instructor. Fall. 3 units. *McIntosh and staff*

201. Microscopic Anatomy. Histology of all the major organs of the body. Structure and cell biology at both the light and electron microscope levels. Laboratory sessions are used to study and analyze our extensive slide collection of mammalian tissues with light microscopes. Designed for medical students; graduate students accepted with consent of instructor. Prerequisite: Cell Biology 200. 3 units. *McIntosh and staff*

202. Medical Physiology. Lectures and conferences on cell and organ physiology. Human and medical aspects are stressed in clinical conferences. Computer-based laboratory exercises. Designed for medical students; graduate students only with consent of instructor. Students may take either 202 or 203 and 204, but not both, for credit. Fall. Prerequisite: Cell Biology 200. 4 units. *N. Anderson and staff*

203. Introduction to Physiology. Modern organ physiology: cellular physiology, the heart and cardiovascular system, the respiratory system, the kidney, the gastrointestinal, endocrine, and nervous systems. Prerequisite: elementary biology. 4 units. *Blum and staff*

204. Cell and Molecular Physiology. Selected aspects illustrating the use of cellular and molecular approaches to the understanding of physiological organ functions. Topics include: molecular basis of contraction and muscle diversity, cell-cell interactions through cell junctions, paracrine or hormonal signals, signal transduction, molecular basis of channel and carrier functions, physiology of transgenic mice. Prerequisite: Cell Biology 203 or cell biology. 3 units. *Mandel and staff*

205. Design and Analysis of Biological Experiments. An introductory-level course for individuals engaged in or planning research projects in life sciences. Emphasis is on developing an adequate background in the fundamentals of probability, statistics, and hypotheses testing, and the application of those principles to commonly encountered research situations. The course will include lectures, hands-on use of the Statistical Analysis System (SAS) computer package for data analysis, and critical evaluation of experimental designs employed in representative studies from the literature. 3 units. *Lobaugh*

208. Cellular Neurobiology. Consent of instructor required. See C-L: Neurobiology 208. 3 units. *Augustine, Kauer, and Reinhart*

210. Independent Study. Directed reading and study in cell biology/physiology. Descriptions of specific areas may be obtained from the Director of Graduate Studies. Consent of Director of Graduate Studies required. 3 to 9 units each. C-L: Marine Sciences. Variable credit. *Staff*

211. Cellular Mechanisms of Injury. Selected topics in mechanisms of injury at the cellular and molecular levels chosen for reading and discussion in a combined lecture/seminar format. Subject matter varies each semester; can be taken more than once. Consent of instructor required. 3 units. *Fridovich, LeFurgey, Lieberman, Mandel, Steenbergen, and guest faculty*

212. Topics in Reproductive Biology. An in-depth, integrative study of male and female reproduction, including (i) hypothalamic, pituitary, and gonadal control mechanisms, (ii) gamete structure and development, (iii) fertilization, and (iv) pregnancy and parturition. Guest lectures will emphasize the interface between basic, veterinary, and medical sciences. Prerequisite: Cell Biology 269 or equivalent. 3 units. *N. Anderson, Saling, Schomberg, or Tyrey*

213. Oxygen and Physiological Function. The sensitive dependence of many physiological functions on cellular oxidative metabolism. The delicate balance between the oxygen toxicity of hyperoxia and the consequences of hypoxia will be explored from organ malfunction to cell death. Prerequisite: an introductory course in physiology or biochemistry or consent of instructor. 2 units. *Jöbsis*

215. Seminar in the Physiology of Disease. Invited staff and guest speakers discuss their research, emphasizing the normal physiology and pathophysiology underlying particular abnormalities or diseases. Organismic, organ, cellular, and molecular levels of organization. 1 unit. *Mandel and guest faculty*

219. Molecular and Cellular Bases of Differentiation. A multidisciplinary approach stressing the molecular, cellular, and genetic processes involved in differentiation in eukaryotes. C-L: Biochemistry 219, Immunology 219, Microbiology 219, and Pathology 219. 3 units. *Counce and staff*

223. Cellular and Integrative Cardiovascular Physiology and Biophysics. Electrical and mechanical properties of the heart at the cellular and organ levels; reflex control of cardiac output; the heart as an endocrine organ; interaction between heart, kidney, and lung; comparative cardiac physiology. Prerequisites: Cell Biology 203 or equivalent and Physics 52L or equivalent; consent of instructor or graduate status. C-L: Biomedical Engineering 223. 3 units. *Benjamin and staff*

232. Extracellular Matrix and Cell Adhesion. Recent research articles will be read and discussed in depth at a two-hour meeting once a week. Instructors will select papers and provide a brief introduction. Students will present papers and lead discussion in a journal club format. Topics covered will include: fibronectin, laminin, tenascin, collagens; integrins and cell-substrate adhesion; cell-cell adhesion molecules. Offered in odd-numbered years. C-L: Biochemistry 232. 2 units. *Bennett and Erickson*

235. Advanced Research Training in Marine Molecular Biology and Biotechnology. Modern molecular biology taught in lectures and laboratory exercises using fish, molluscs, algae, and other marine forms. Topics and techniques include DNA, RNA and protein assays; techniques of gene transfer, amplification and mapping; plasmid isolation; genomic library screening and bacteriological and cell culture techniques. (Given at Beaufort.) Prerequisites: biochemistry and cell biology or equivalent; for undergraduates, consent of instructor required. C-L: Environment 254 and Marine Sciences. 4 units. *Staff*

235L. Advanced Research Training in Marine Molecular Biology and Biotechnology. Same as 235 with laboratory. C-L: Environment 254L and Marine Sciences. 6 units. *Staff*

237. Analytical Imaging in Biomedical Research. Weekly seminars to discuss concepts and techniques in high resolution analytical imaging of cells and subcellular organelles and to review application of these concepts to structural-functional correlations in cell physiology and pathophysiology. 3 units. *Ingram, Kopf, and LeFurgey*

243. Environmental Biochemistry. Introduction to the (macro)molecules of life and fundamental metabolic pathways. Topics are presented in the context of environmental perturbations. Fundamental aspects of energetics, proteins, enzymes, carbohydrates, lipids, and nucleic acids. Emphasis on mechanisms of adaptation, molecular controls, and responses to toxicants. (Given at Beaufort.) Prerequisite: organic chemistry. C-L: Environment 243 and Marine Sciences. 3 units. *Bonaventura and Brouwer*

244. Cellular and Molecular Research Techniques. Introduction to the use of electrophoresis, chromatography, enzymology, equilibrium assays, rapid reaction kinetics, microscopy, molecular graphics, and various modes of spectroscopy in analyzing molecules and tissues of organisms collected from polluted and pristine environments. The applicability of techniques of modern molecular biology are discussed in relation to other research techniques used to examine fundamental molecular mechanisms and the adverse effects of pollutants on natural processes. (Given at Beaufort.) Prerequisite: organic chemistry. C-L: Environment 244 and Marine Sciences. 3 units. *Bonaventura and Brouwer*

251. Molecular Cell Biology. Current research topics in cell biology presented in a lecture and discussion format based on recent research papers. Topics include: protein secretion and trafficking; mitochondria and organelles; the nucleus; cytoskeleton and cell motility; extracellular matrix and cell adhesion; growth factors and signalling; cell cycle. C-L: Cell and Molecular Biology 251. 4 units. *Erickson and staff*

259. Molecular Biology I: Proteins and Enzymes. Prerequisite: introductory biochemistry or consent of instructor. See C-L: Cell and Molecular Biology 259; also C-L: Biochemistry 259, Immunology 259, Microbiology 259, and Molecular Biophysics 259. 3 units. *Richardson and staff*

268. Molecular Biology II: Nucleic Acids. Prerequisites: introductory biochemistry and BCH/CMB/CBI/IMM/MIC 259, or consent of instructor. See C-L: Cell and Molecular Biology 268; also C-L: Biochemistry 268, Immunology 268, Microbiology 268, and The University Program in Genetics. 4 units. *Steege and staff*

269. Advanced Cell Biology. Prerequisite: introductory cell biology or consent of instructor. See C-L: Zoology 269; also C-L: Botany 269, Cell and Molecular Biology 269, Immunology 269, and Microbiology 269. 3 units. *Siedow and staff*

270S. Molecular and Cellular Adaptations of Marine Organisms. Marine organisms meet the challenge of living in a hostile and ever-changing environment by numerous adaptive mechanisms. Focus on the underlying cellular and molecular processes. Topics explored with regard to adaptive processes in marine organisms include changes in metabolism, respiration, and vision. The impact of environmental pollutants and human health significance will also be addressed. (Given at Beaufort.) C-L: Environment 224S and Marine Sciences. 2 units. *C. Bonaventura*

280. Student Seminar. Preparation and presentation of seminars to students and faculty on topics of broad interest to cell biology and physiology. Required of Department of Cell Biology students. 1 unit. *Staff*

293. Membrane Biophysics. See C-L: Molecular Biophysics 293; also C-L: Mechanical Engineering 265. 3 units. *T. McIntosh and staff*

301. Introduction to Cell and Molecular Biology. Three weeks of intensive laboratory exercises utilizing modern techniques of gene cloning; PCR; protein expression and purification; light and electron microscopy. Laboratory work will be supplemented with lectures and discussion groups. Course begins two weeks prior to the opening of the semester. 1 unit. *Titus and staff*

312. Research. Specific areas of investigation include: membrane structure; extracellular matrix; cell adhesion; cell motility; cytoskeletal elements; chromosome structure and movement; genetics and molecular biology of contractile proteins; muscle ultrastructure; gamete biology; molecular and structural biology of photoreceptors; hormone receptors; cell growth; developmental biology; membrane transport and electrophysiology; metabolism; cardiovascular physiology; microcirculation; hyperbaric physiology; and theoretical studies and computer modeling of physiological processes. Variable credit. *Staff*

320. Research Problems in Cell Biology. Coverage of selected topics important in current cell biology research. Format includes faculty lectures and directed readings of current research papers presented and discussed by students. 3 units. *Sheetz and staff*

417. Cellular Signaling. Mechanism of action of hormones at the cellular level including hormone-receptor interactions, secondary messenger systems for hormones, mechanisms of regulation of hormone responsiveness, regulation of growth, differentiation and proliferation, mechanisms of transport and ion channels, stimulus sensing and transduction. Some lectures stress the clinical correlation of the basic course concepts. C-L: Biochemistry 417 and Pharmacology 417. 3 units. *Bell, Caron, Casey, Means, and invited lecturers*

COURSES CURRENTLY UNSCHEDULED

217. Selected Membrane Transport

236S. Seminar on the Cellular and Molecular Biology of Skeletal Muscle

305. Selected Topics in Cardiac Physiology

Chemistry

Professor Crumbliss, *Chair* (101 Gross Chemical Laboratory); Professor McGown, *Director of Graduate Studies* (329 Gross Chemical Laboratory); Professors Baldwin, Bonk, Chesnut, Fraser-Reid, Lochmüller, McPhail, Palmer, Porter, Shaw, Smith, and Wells; Associate Professors Henkens, MacPhail, and Pirrung; Assistant Professors Burk, Coury, Prisant, Toone, and Yang; Professors Emeriti Arnett, Bradsher, Brown, Hobbs, Poirier, Quin, Strobel, and Wilder; Adjunct Professors Andrews, Chao, Ghirardelli, Spielvogel, and Sternbach

In the Department of Chemistry graduate work is offered leading to the M.S. and Ph.D. degrees. Before undertaking a graduate program in chemistry, a student should have taken an undergraduate major in chemistry, along with related work in mathematics and physics. Graduate courses in the department are offered in the fields of analytical, biological, inorganic, organic, and physical chemistry. Research programs are active in all these fields. A booklet providing detailed information on the department is available from the director of graduate studies.

For Seniors and Graduates

201. Molecular Spectroscopy. Selected spectroscopic methods in the study of molecular structure. Symmetry and group theoretical basis for selection rules, theories

of magnetic and optical resonance, and interpretation of spectra; examples from both inorganic and organic chemistry. Three lectures. Open to especially well-prepared undergraduates by consent of Director of Undergraduate Studies. 1 to 3 units. Variable credit. *Baldwin, Fraser-Reid, Palmer, Pirrung, Prisant, and Smith*

203. Quantum Chemistry. Basic principles of quantum and group theoretical methods. Topics include symmetry and a review of the fundamentals and the mathematical foundations of quantum theory. Emphasis on the application of molecular orbital theory to organic and inorganic systems. Open to especially well-prepared undergraduates by consent of Director of Undergraduate Studies. 1 to 3 units. Prerequisite: Chemistry 162L. Variable credit. *Chesnut, MacPhail, and Porter*

205. Structure and Reaction Dynamics. Structure and mechanisms in organic and inorganic compounds, substitution reactions, linear free energy relations, and molecular rearrangements. Emphasis on the use of kinetic techniques to solve problems in reaction mechanisms. Three lectures. Open to especially well-prepared undergraduates by consent of Director of Undergraduate Studies. 1 to 3 units. Variable credit. *Crumbliss, Porter, Toone, and Wells*

207. Principles of Kinetics, Thermodynamics, and Diffraction. Three lectures. Open to especially well-prepared undergraduates by consent of Director of Undergraduate Studies. 1 to 3 units. Variable credit. *McPhail, Prisant, Smith, and Yang*

275, 276. Advanced Studies. (1) Analytical chemistry, (2) inorganic chemistry, (3) organic chemistry, and (4) physical chemistry. Open to especially well-prepared undergraduates by consent of Director of Undergraduate Studies. 3 units each. *Staff*

For Graduates

300. Basic Statistical Mechanics. Fundamentals of quantum and classical statistical mechanics using the ensemble approach. Emphasis on systems of weakly interacting particles with internal degrees of freedom. 3 units. *Staff*

302. Basic Quantum Mechanics. The fundamentals of quantum mechanics with special emphasis on chemical applications. Topics included are: linear algebra, the uncertainty relations, angular momentum, perturbation theory and time dependent phenomena, molecules in electromagnetic fields, group methods, and electron correlation. 3 units. *Staff*

303, 304. Special Topics in Physical Chemistry. Presentation of one or more topics of staff interest such as advanced methods in crystallography, light scattering and small angle X-ray diffraction, application of ESR spectroscopy to chemical problems, electronic spectroscopy of proteins, group theory, intermolecular forces, liquid crystals, methods of determining the rates of elementary steps in reaction kinetics, physical chemistry of aerosols, physical-chemical methods of polymer characterization, structure and bonding in metallo-enzymes, statistical mechanics of fluids, topics in structural chemistry, and triplet excitons. 1 to 3 units each. Variable credit. *Staff*

306. Biophysical Chemistry. The interrelationships between structure, function, and mechanisms of biological macromolecules. Principles of dynamics (including kinetics, reactivity, and transport) and structure (including thermodynamics, NMR, fluorescence, CD spectroscopy, and other applicable biophysical techniques). 2 to 3 units. Variable credit. *Henkens or Shaw*

310. Electronic Structure and Spectroscopy of Transition Metal Compounds. The theory of ligand fields and its application to the electronic spectroscopy, electron spin resonance, and magnetism of transition metal compounds. 2 units. *Palmer*

312. Chemistry of the Main Group Elements. Preparations, bonding, structures, and reactivity of compounds of the main group elements with emphasis on members of the *p* block groups. 3 units. *Crumbliss and Wells*

313. Special Topics in Inorganic Chemistry. Lectures, oral reports, and discussions on advanced topics and recent advances in the field of inorganic chemistry. Examples of topics which may be discussed are bioinorganic chemistry, fluxional molecules, homogeneous catalysis, synthesis and properties of selected groups of compounds, and new physical methods. 1 to 3 units. Variable credit. *Staff*

314. Advanced Inorganic Reaction Mechanism. A discussion of the mechanism of coordination and organometallic reactions in solvent solution. Examples include redox reactions and linear free energy relationships. Consent of instructor required. 2 units. *Crumbliss*

320. Synthetic Organic Chemistry. A study of the scope and limitations of the more important types of reactions in synthetic organic chemistry. Some discussion of the rapidly developing use of transition metals, complex hydrides, and photochemistry will be included. 3 units. *Baldwin or Fraser-Reid*

322. Organic Reactive Intermediates. A discussion of reactive intermediates in organic chemistry. Topics will include carbanions, carbenes, carbonium ions, free radicals, photochemical excited states, and other reactive species. 3 units. *Porter*

324. Special Topics in Organic Chemistry. Advanced topics and recent developments in the field of organic chemistry. Representative topics include heterocyclic chemistry, natural products chemistry, carbohydrate chemistry, molecular mechanics, and two-dimensional NMR spectroscopy. Lectures and written and oral reports. 1 to 3 units. Variable credit. *Staff*

326. Bioorganic Chemistry. An investigation of biochemical principles from the viewpoint of the organic chemist. Fundamental and applied enzymology, enzyme inhibition, enzyme models, biosynthetic pathways, methodology for the study of biological transformations, molecular biology for organic chemists. 3 units. *Pirrung and Toone*

330. Separation Science. Section .01, fundamental separation chemistry; section .02, practical aspects of chromatographic methods; section .03, larger scale processes. 1 to 3 units. Variable credit. *Lochmüller*

331, 332. Special Topics in Analytical Chemistry. An advanced treatment of important areas in modern analysis. Possible topics include: electrochemistry, small computer applications, magnetic resonance, and problem-solving approaches. 1 to 3 units each. Variable credit. *Staff*

334. Electroanalytical Chemistry. Fundamentals and applications of techniques for probing heterogeneous charge transfer reactions, including cyclic voltammetry at conventional and ultra micro electrodes. 2 units. *Coury*

336. Analytical Spectroscopy. Fundamentals of atomic and molecular spectroscopies for chemical analysis, emphasizing absorption, emission, and luminescence techniques. 2 units. *McGown*

373, 374. Seminar. One unit is required of all Ph.D. candidates in chemistry. One hour a week discussion. 1 unit each. *All members of the graduate staff*

375, 376. Research. Instruction in methods used in the investigation of original problems. Individual work and conferences. 1 to 6 units each. Variable credit. *All members of the graduate staff*

377. Research Orientation Seminar. A survey of departmental research. Required of all entering graduate students in chemistry. Consent of Director of Graduate Studies required. 1 unit. *All members of the graduate staff*

Classical Studies

Professor Clay, *Chair* (237 Allen); Professor Oates, *Director of Graduate Studies* (229A Allen); Professors Connor, Newton, and Younger; Associate Professors Boatwright, Burian, Rigsby, and Stanley; Assistant Professor Janan; Professors Emeriti Richardson and Willis

The Department of Classical Studies offers graduate work leading to the A.M. and Ph.D. degrees in classical studies. Work in the department encompasses all aspects of the Greco-Roman world: students in the program are able, through course work, directed research, and their own teaching, to prepare for careers of teaching and research as broadly trained classical scholars. For regular admission, students should offer at least three years of college study in one of the classical languages and two in the other. Before developing a specialization within the program, students are expected to acquire facility in both Greek and Latin, a broad knowledge of the literatures and of ancient history and archaeology, and command of research methods. Reading knowledge of French and German is required for the Ph.D. The resources of the department include important collections of Greek and Latin manuscripts and papyri, computer facilities in the ancient languages, and a valuable study collection of Greek and Roman art. The journal *Greek, Roman, and Byzantine Studies* is published at Duke. The director of graduate studies will provide on request a brochure giving further information about the department's requirements, resources, and financial aid; prospective students should also consult the general requirements of the university set forth in the chapter on "Registration" in this bulletin.

GREEK

For Seniors and Graduates

200. **Readings in Greek Literature.** 3 units. *Staff*
201. **Studies in Greek Literature I.** 3 units. *Staff*
202. **Studies in Greek Literature II.** 3 units. *Staff*
203. **Homer.** Problems of language and structure in the *Iliad*; present state of Homeric scholarship. 3 units. *Stanley*
205. **Greek Lyric Poets.** Fragments of the early lyric poets; selected odes of Pindar and Bacchylides. 3 units. *Burian or Stanley*
207. **The Dramatists.** Readings and studies of selected plays by the major playwrights Aeschylus, Sophocles, Euripides, and Aristophanes. 3 units. *Burian*
210. **Alexandrian Poetry.** Emphasis on the *Argonautica* of Apollonius of Rhodes, and attention to the shorter poems of Theocritus and Callimachus. 3 units. *Stanley*
222. **The Historians.** Readings and studies in the major Greek historians Herodotus, Thucydides, and Xenophon. 3 units. *Oates*
226. **The Orators.** Selections from the principal Attic orators, with emphasis on Lysias and Demosthenes. 3 units. *Connor*

For Graduates

301. **Seminar in Greek Literature I.** Selected authors and topics. 3 units. *Burian, Clay, or Stanley*

302. Seminar in Greek Literature II. Selected authors and topics. 3 units. *Burian, Clay, or Stanley*

313. Seminar in Greek Epigraphy. 3 units. *Rigsby*

399. Directed Reading and Research. Credit to be arranged. Variable credit. *Staff*

Courses Currently Unscheduled

209. Introduction to Hellenistic Literature

221. Early Greek Prose

321. Seminar in Literary Papyri

LATIN

For Seniors and Graduates

200. Readings in Latin Literature. 3 units. *Staff*

201. Studies in Latin Literature I. 3 units. *Staff*

202. Studies in Latin Literature II. 3 units. *Staff*

205. The Roman Novel. Readings in Petronius and Apuleius. 3 units. *Richardson*

206S. Cicero. 3 units. *Richardson*

207S. Vergil's *Aeneid*. Intensive analysis of all of Vergil's *Aeneid*, focusing on text and historical context, complemented by research papers and reports. Not open to students who have taken Latin 107S. 3 units. *Newton*

208S. Lyric and Occasional Poetry. Readings in the works of Catullus, Horace, and Martial. Same as 108S, except additional term paper required. 3 units. *Janan or Newton*

211S. Elegiac Poets. Analysis of most of the *corpora* of Propertius, Tibullus, and Ovid with close attention to the stylistics of the poems, their place in the traditions of Latin love elegy, and their relation to other phenomena of the Augustan period. Not open to students who have taken Latin 111S. 3 units. *Janan or Richardson*

214S. The Historians. Investigations of the Romans' conceptions and practices of writing history, based on detailed analysis of the works of Sallust, Livy, and Tacitus. Additional readings in the fragments of other Latin historians, and in comparative Greek historians. Not open to students who have taken Latin 114S. 3 units. *Boatwright or Richardson*

217T. Latin Prose Composition. The course content is determined by the needs of the students enrolled. 3 units. *Staff*

221. Medieval Latin. Selected works of the Latin Middle Ages from Prudentius to the humanists. Genres studied usually include the hymn, sequence, drama, lyric, saints' lives, chronicle, epic, and epistle. C-L: Medieval and Renaissance Studies. 3 units. *Newton*

For Graduates

301. Seminar in Latin Literature I. Selected authors and topics. 3 units. *Boatwright, Janan, or Newton*

302. Seminar in Latin Literature II. Selected authors and topics. 3 units. *Boatwright, Janan, or Newton*

312. Seminar in Latin Palaeography. 3 units. *Newton*

315. **Seminar in Roman Law.** 3 units. *Oates*

399. **Directed Reading and Research.** Credit to be arranged. Variable credit. *Staff*

Courses Currently Unscheduled

204. **Epic of the Silver Age**

314. **Seminar in Latin Epigraphy**

CLASSICAL STUDIES

For Seniors and Graduates

203. **Ancient Political Philosophy.** See C-L: Political Science 223. 3 units. *Gillespie or Grant*

211S. **Plato.** Selected dialogues. C-L: Philosophy 211S. 3 units. *Ferejohn*

217S. **Aristotle.** Selected topics. C-L: Philosophy 217S. 3 units. *Ferejohn*

220S. **Topics in Greek Art.** Consent of instructor required. See C-L: Art 201S. 3 units. *Staff*

221. **Archaic Greece.** Greece and the Near East from the end of the Bronze Age to the Persian Wars. C-L: History 259. 3 units. *Oates or Rigsby*

222. **Fifth and Fourth Century Greece.** From the Persian Wars to the dominance of Philip of Macedon. C-L: History 260. 3 units. *Oates or Rigsby*

224. **The Roman Republic.** The rise of Rome, to its mastery of the Mediterranean; the political, social, and intellectual consequences. C-L: History 263. 3 units. *Boatwright or Rigsby*

227S. **Topics in Roman Art.** Consent of instructor required. See C-L: Art 202S. 3 units. *Staff*

230S. **Topics in Early Christian and Byzantine Art.** Consent of instructor required. See C-L: Art 233S; also C-L: Medieval and Renaissance Studies and Religion 275S. 3 units. *Wharton*

231S. **Greek Sculpture.** Free standing, relief, and architectural sculpture from the archaic period to the Hellenistic age, representing changing aesthetic, social, and political aims. C-L: Art 238S. 3 units. *Younger*

232S. **Greek Painting.** From the Late Bronze Age to the fourth century B.C., with emphasis on archaic and classical Athenian vase painters. C-L: Art 237S. 3 units. *Stanley*

258. **The Hellenistic and Roman East.** The social and cultural history of the Greco-Roman world, concentrating on papyrological evidence. Prerequisites: knowledge of ancient Greek and Latin. 3 units. *Oates*

For Graduates

301. **Proseminar: Introduction to Classical Studies.** 3 units. *Rigsby*

311. **Archaeology Seminar I.** Selected topics. 3 units. *Staff*

312. **Archaeology Seminar II.** Selected topics. 3 units. *Staff*

321. **Seminar in Ancient History I.** Selected topics. 3 units. *Boatwright, Oates, or Rigsby*

322. Seminar in Ancient History II. Selected topics. 3 units. *Boatwright, Oates, or Rigsby*

399. Directed Reading and Research. Credit to be arranged. Variable credit. *Staff*

Courses Currently Unscheduled

223. Alexander and the Hellenistic World

225. The Roman Empire

226. Late Antiquity

233S. Greek Architecture

234S. Roman Sculpture

235S. Roman Architecture

236S. Roman Painting

327. Seminar in Byzantine History

Under the terms of a cooperative agreement, graduate students of Duke University may take any graduate course offered by the Department of Classics of the University of North Carolina. A list of these courses will be sent upon request.

Computer Science

Professor Vitter, *Chair* (206 North Building); Associate Professor of the Practice Ramm, *Associate Chair* (201 North Building); Associate Professor Wagner, *Director of Graduate Studies* (211 North Building); Professors Behringer, Biermann, Gelenbe, Loveland, Marinos, Palmer, Patrick, Reif, Rose, Starmer, Trivedi, and Utku; Associate Professors Agarwal, Ellis, Gardner, Greenside, and Kedem; Assistant Professors Board, Dollas, Kao, Prisant, and Nadathur; Professor Emeritus Gallie; Assistant Research Professors Grove, Long, and Pantazis; Adjunct Professors Coughran and Whitted; Adjunct Associate Professors Brglez and Dugan; Adjunct Assistant Professors Levenson, Marshall, and McHugh

The Department of Computer Science offers programs leading to the M.S. and Ph.D. degrees. The department also actively cooperates with the Department of Computer Science of the University of North Carolina at Chapel Hill.

A student entering graduate work in computer science should have had three semesters of calculus and one semester of linear algebra, and should have a knowledge of data structures, and of assembler as well as higher-level computer programming languages. Research interests of present faculty include mathematical foundations of computer science, artificial intelligence, analysis of algorithms, programming methodology, real-time computing, operating data base systems, computer systems design and analysis, parallel processing systems, scientific computation (including numerical analysis), and VLSI design.

Each student should consult the document *Graduate Degree Requirements of the Computer Science Department* for degree requirements not listed in this bulletin.

For Seniors and Graduates

206. Programming Languages. Information binding, data structures and storage, control structures, recursion, execution environments, input/output; syntax and semantics of languages; study of PL/1, Fortran, Algol, APL, LISP, SNOBOL, and SIMULA; exercises in programming. Not open to students who have taken Computer Science 201. Prerequisite: Computer Science 200 or 208. 3 units. *Staff*

208. Programming Methodology. Practical and theoretical topics including structured programming, specification and documentation of programs, debugging and testing strategies, choice and effective use of programming languages and systems, psychology of computer programming, proof of correctness of programs, analysis of algorithms, and properties of program schemata. Not open to students who have taken Computer Science 200. Prerequisite: Computer Science 100 or 103. 3 units. *Staff*

210. Operating Systems. Fundamental principles of operating system design applied to state-of-the-art computing environments (multiprocessors and distributed systems) including process management (coscheduling and load balancing), shared memory management (data migration and consistency), and distributed file systems. Advanced topics include transaction-based operating systems, reliable communication protocols, concurrency control and recovery mechanisms, computer security, and performance analysis. Not open to students who have taken Computer Science 231. 3 units. *Ellis*

214. Computer Networks and Distributed Systems. Basic systems support for process-to-process communications across a computer network. The TCP/IP protocol suite and the Berkeley sockets application programs interface. Development of network application programs based on the client-server model. Remote procedure call and implementation of remote procedure call. Not open to students who have taken Computer Science 255. Prerequisite: knowledge of the C programming language. 3 units. *Staff*

216. Data Base Methodology. Basic concepts and principles. Relational, hierarchical, and network approaches to data organization; data entry and query language support for data base systems; theories of data organization; security and privacy issues. Not open to students who have taken Computer Science 241. Prerequisites: Computer Science 104 and either 109 or 155 or equivalent. 3 units. *Staff*

218. Compiler Construction. Models and techniques used in the design and implementation of assemblers, interpreters, and compilers. Lexical analysis, compilation of arithmetic expressions and simple statements, specifications of syntax, algorithms for syntactic analysis, code generation and optimization techniques. Not open to students who have taken Computer Science 232 before fall 1994. 3 units. *Staff*

220. Computer Systems Organization. Hardware and software aspects. Processor, memory, device, and communication subsystems; case studies of hardware system organization, for example, parallel, associative, fault-tolerant; organization of software systems to exploit hardware systems organization; economic and reliability aspects of various hardware organizations. Not open to students who have taken Computer Science 252 before fall 1994. Prerequisites: Computer Science 104 and 120 or 157. 3 units. *Wagner*

222. Introduction to VLSI Systems. A first course in VLSI design with CMOS technologies. A study of devices, circuits, fabrication technology, logic design techniques, subsystem design and system architecture. Modeling of circuits and subsystems. Testing of gates, subsystems and chips, and design for testability. The fundamentals of full-custom design, and some semi-custom design. Not open to students who have taken Computer Science 210 before fall 1994. Prerequisite: Electrical Engineering 151 or equivalent; Electrical Engineering 161 or equivalent. 3 units. *Dollas or Kedem*

223. Application Specific VLSI Design. Introductory VLSI design course. Modern design methods and technology for implementing application specific integrated circuits (ASICs). Semicustom design methodology, semicustom VLSI technologies such as gate arrays, standard cells and FPGAs; the use of ASIC Computer Aided Design (CAD)

tools. Mapping algorithms into high performance silicon implementation. Prerequisite: course in logic design. 3 units. *Kedem*

225. Fault-Tolerant and Testable Computer Systems. Not open to students who have taken Computer Science 207. Prerequisite: Electrical Engineering 151 or equivalent. See C-L: Electrical Engineering 254. 3 units. *Marinos*

226. Mathematical Methods for Systems Analysis I. Basic concepts and techniques used in the stochastic modeling of systems. Elements of probability, statistics, queuing theory, and simulation. Prerequisite: four semesters of college mathematics. C-L: Electrical Engineering 255. 3 units. *Trivedi*

228. Communication, Computation, and Memory in Biological Systems. Communication and memory in biological systems: voltage sensitive ion channels, hormone-receptor interactions, and initiation and control of RNA/DNA synthesis. Models of signaling and memory are developed and related to electronic signaling schemes. Not open to students who have taken Computer Science 276. Prerequisites: Computer Science 100 or 103, two semesters of college chemistry, and four semesters of college mathematics. 3 units. *Stamer*

230. Design and Analysis of Algorithms. Design and analysis of efficient algorithms. Algorithmic paradigms. Applications include sorting, searching, dynamic structures, graph algorithms, randomized algorithms. Computationally hard problems. NP completeness. Not open to students who have taken Computer Science 205. Prerequisite: Computer Science 100 or equivalent. 3 units. *Staff*

232. Mathematical Analysis of Algorithms. Techniques for efficient implementation and precise analysis of computer algorithms. Combinatorial mathematics and elementary probability. Emphasis on obtaining exact closed-form expressions describing the worst-case or average-case time and space requirements for particular computer algorithms, whenever possible. Asymptotic methods of analysis for obtaining approximate expressions in situations where exact expressions are too difficult to obtain or to interpret. Not open to students who have taken Computer Science 202. Prerequisites: Mathematics 103 and 104 or equivalents. 3 units. *Staff*

234. Computational Geometry. Models of computation and lower-bound techniques; storing and manipulating orthogonal objects; orthogonal and simplex range searching, convex hulls, planar point location, proximity problems, arrangements, linear programming and parametric search technique, probabilistic and incremental algorithms. Not open to students who have taken Computer Science 240 before fall 1994. Prerequisite: Computer Science 205 or 230 or equivalent. 3 units. *Agarwal or Reif*

236. Parallel Algorithms. Models of parallel computation including parallel random access machines, circuits, and networks; NC algorithms and P-completeness; graph algorithms, sorting algorithms, network routing, tree contraction, string matching, parsing algorithms; randomization and derandomization techniques. Not open to students who have taken Computer Science 230 before fall 1994. Prerequisite: Computer Science 205 or 230 or equivalent. 3 units. *Kao or Reif*

238. Numerical and Algebraic Algorithms. Introduction to polynomial problems, matrix problems—general and sparse; numerical algorithms, fast Fourier transform, eigenvalue computation, number theory and cryptography. Not open to students who have taken Computer Science 206 before fall 1994. Prerequisites: Computer Science 230 and 252, or equivalents. 3 units. *Reif or Rose*

240. Computational Complexity. Turing machines, undecidability, recursive function theory, complexity measures, reduction and completeness, NP, NP-Completeness, co-NP, beyond NP, relativized complexity, circuit complexity, alternation, polynomial

time hierarchy, parallel and randomized computation, algebraic methods in complexity theory, communication complexity. Not open to students who have taken Computer Science 225 before fall 1994. Prerequisite: Computer Science 140 or equivalent. 3 units. *Agarwal*

242. Logic for Computer Science. Aspects of logic with a focus on computational issues. Topics include propositional and predicate calculi and the theory underlying their automation, that is, the compactness theorems, the Herbrand-Skolem-Gödel theorem, unification, and resolution. Proof procedures and their search characteristics. The use of natural deduction and sequent calculi in describing logics, specifying programming language semantics and formalizing type systems. Structural properties, such as cut-elimination, in such systems. The logical systems underlying programming languages like Prolog and ML. Applications of logic in automated reasoning, program verification and synthesis. Not open to students who have taken CPS 218 before fall 1994. C-L: Philosophy 210. 3 units. *Loveland or Nadathur*

250. Numerical Analysis. Error analysis, interpolation and spline approximation, numerical differentiation and integration, solutions of linear systems, nonlinear equations, and ordinary differential equations. Not open to students who have taken Computer Science 221. Prerequisites: knowledge of an algorithmic programming language, intermediate calculus including some differential equations, and Mathematics 104. C-L: Mathematics 221 and Statistics 273. 3 units. *Gardner, Greenside, or Rose*

252. Numerical Differential Equations. Numerical methods for solving ordinary and partial differential equations emphasizing nonlinear differential equations. Methods for solving ordinary differential equations that generalize to solve partial differential equations: finite difference, spectral, and finite element methods. Solution of hyperbolic, parabolic, and elliptical partial differential equations arising in scientific problems. Not open to students who have taken Computer Science 222 before fall 1994. Prerequisite: Computer Science 221 or 250. C-L: Mathematics 222. 3 units. *Gardner, Greenside, or Rose*

254. Numerical Linear Algebra. Solution of large, sparse linear systems of equations. Storage schemes, graph theory for sparse matrices, different orderings to minimize fill, block factorizations, iterative methods, analysis of different splittings, conjugate gradient methods. Eigenvalue problems, QR factorization, Lanczos method, power method and inverse iteration, Rayleigh quotient. Not open to students who have taken Computer Science 223 before fall 1994. Prerequisite: Computer Science 221 or 250 or equivalent. C-L: Mathematics 223. 3 units. *Rose*

256. Functional Analysis for Scientific Computing. Linear spaces, topologies, norms, and completeness. Focus on Banach and Hilbert spaces including Sobolev spaces. Linear and nonlinear operators. Fréchet derivatives. Iterative methods for nonlinear operator systems, such as Newton-like methods. Applications. Intended for science and engineering students but not mathematics graduate students. Not open to students who have taken Computer Science 245. Prerequisite: Computer Science 221 or 250. C-L: Mathematics 245. 3 units. *Rose*

260. Introduction to Scientific Computing. Practical introduction for students and faculty to computer resources that facilitate scientific research: scientific word processing (Tex and LaTeX), symbolic manipulation programs, software tools, numerical software packages, and graphics. Case studies used to illustrate these resources. For noncomputer scientists. Not open to students who have taken Computer Science 212. Prerequisite: Mathematics 103, 104, or equivalent; some programming experience. 3 units. *Gardner or Greenside*

264. Nonlinear Dynamics. Introduction to the mathematical theory of nonlinear dynamics, and how this theory compares with physical experiments, with applications

to biology (Turing states and morphogenesis), computer science (randomness and computability), mathematics (chaos and strange attractors), and physics (pattern formation and transition to turbulence). Not open to students who have taken Computer Science 213. Prerequisites: Computer Science 8 or 53, Mathematics 111, and Physics 51L, 52L. C-L: Physics 213. 3 units. *Behringer or Greenside*

270. Artificial Intelligence. Heuristic versus algorithmic methods; programming of games such as chess; theorem proving and its relation to correctness of programs; readings in simulation of cognitive processes, problem solving, semantic memory, analogy, adaptive learning. Not open to students who have taken Computer Science 215. Prerequisite: Computer Science 100 or 103 or consent of instructor. 3 units. *Biermann, Loveland, or Nadathur*

274S. Computational Linguistics Seminar. Readings and research seminar on topics related to the processing of English or other natural languages: syntax, semantics, pragmatics, discourse, and others. Not open to students who have taken Computer Science 216S. Prerequisite: Computer Science 215 or 270 or consent of instructor. 3 units. *Biermann*

291. Reading and Research in Systems. 3 units. *Staff*

292. Reading and Research in Algorithms and Complexity. 3 units. *Staff*

293. Reading and Research in Scientific Computing. 3 units. *Staff*

294. Reading and Research in Artificial Intelligence. 3 units. *Staff*

296. Advanced Topics in Computer Science. Not open to students who have taken Computer Science 265. 3 units. *Staff*

For Graduates

300. Computer Science Research Seminar. The course is designed to orient first-year graduate students and to provide an in-depth look at the research projects going on in the department. The course also emphasizes the necessary skills for research investigation and presentation in computer science. In particular, instruction is given in how to formulate research problems or projects, identify goals, and present results. (Concentration on the problem-solving aspect of research is the focus of the research project or thesis during the following semester.) Students will make and critique technical presentations, both oral and written. Not open to students who have taken Computer Science 303. 3 units. *Staff*

310. Topics in Operating Systems. Not open to students who have taken Computer Science 332. 3 units. *Staff*

320. Advanced Topics in Digital Systems. Not open to students who have taken Computer Science 308. Prerequisite: Electrical Engineering 252 or equivalent. See C-L: Electrical Engineering 352. 3 units. *Staff*

322. Advanced VLSI Design. Theory of advanced VLSI design. Specifications development, methodology, issues, circuit-level trade-offs. Full custom design, standard cell design, gate array design, silicon compilation. Semiconductor technologies and logic families for semi-custom design. Clocking schemes and distribution, race conditions. Design of a variety of circuits (adders, I/O drivers, RAM, FIFO, etc.) Testing of all phases in the life cycle of an integrated circuit. Top-down design and bottom-up implementation. Student projects. Not open to students who have taken Computer Science 310 before Fall 1994. Prerequisite: Electrical Engineering 261 or equivalent. C-L: Electrical Engineering 361. 3 units. *Dollas or Kedem*

327. Seminar in Computer Systems Analysis. Topics in computer systems analysis, especially for fault-tolerant systems, including reliability, availability and performance analysis, comparative analysis of architectures, performability, analytic and numerical solution techniques, stochastic Petri nets, simulation. Not open to students who have taken Computer Science 381. 1 to 3 units. Variable credit. *Dugan or Trivedi*

331. Operating Systems Theory. Advanced study of theoretical aspects of operating systems emphasizing models and control of concurrent processes, processor scheduling, and memory management. Prerequisites: Computer Science 226 and 231. 3 units. *Ellis or Wagner*

337. VLSI Algorithmics. Algorithmic and systems aspects of VLSI. Topics include theoretical studies of the layout problem, array logic, placement and routing, fault-tolerance in VLSI designs, design for testability, the design of networks of processors, and cost trade-offs in VLSI designs. Each student will complete an in-depth study of a topic approved by the instructor. Not open to students who have taken Computer Science 320 before Fall 1994. Prerequisites: Computer Science 224 and either 210 or 310. 3 units. *Staff*

340. Theory of Computation. Not open to students who have taken Computer Science 325. 3 units. *Staff*

350. Topics in Numerical Mathematics. Advanced topics in numerical mathematics to be selected from areas of current research. Not open to students who have taken Computer Science 321. Prerequisites: Computer Science 221 and 222. 3 units. *Gardner, Greenside, Lanzkron, or Rose*

364. Advanced Topics in Nonlinear and Complex Systems. Survey of current research topics that may include: advanced signal analysis (wavelets, Karhunen-Loeve decomposition, multifractals), bifurcation theory (amplitude and phase equations, symmetry breaking), spatio-temporal chaos, granular flows, broken ergodicity, complexity theory of dynamical systems, and adaptive systems (genetic algorithms, neural networks, artificial life). Emphasis on quantitative comparisons between theory, simulations, and experiments. Not open to students who have taken Computer Science 313. Prerequisites: Computer Science/Physics 213; recommended: Physics 230, 231, and 303 or equivalents. C-L: Physics 313. 3 units. *Behringer, Greenside, or Palmer*

370. Seminar in Artificial Intelligence. Topics in artificial intelligence, such as natural language understanding, learning, theorem proving and problem solving, search methodologies. Topics will vary from semester to semester. Includes research literature reading with student presentation. Not open to students who have taken Computer Science 382. 1 to 3 units. Variable credit. *Staff*

376. Advanced Topics in Artificial Intelligence. Course content will vary from year to year and will include a detailed study of one or more of the following: mechanical theorem proving, natural language processing, automatic program synthesis, machine learning and inference, representations of knowledge, languages for artificial intelligence research, artificial sensorimotor systems, and others. Not open to students who have taken Computer Science 315. Prerequisite: Computer Science 215. 3 units. *Biermann, Loveland, or Nadathur*

395. Research. Instruction in methods used in the investigation of original problems. Individual work and conferences. 1 to 6 units. Variable credit. *All members of the graduate staff*

399. Special Readings. Variable credit. *Staff*

COURSES CURRENTLY UNSCHEDULED

326. Systems Modeling

SUPPLEMENTARY COURSES OFFERED AT UNC-CH

Comp 145. Software Engineering Laboratory

Comp 171. Natural Language Processing

Comp 230. File Management Systems

Comp 236. Computer Graphics

Comp 238. Raster Graphics

Comp 254. Picture Processing and Pattern Recognition

Comp 265. Architecture of Computers

Cultural Anthropology

Associate Professor Quinn, *Chair and Director of Graduate Studies*; Professors Apte, Mudimbe (literature), O'Barr, and Reddy (history); Associate Professor Silverblatt; Assistant Professors Allison, Ewing, Starn, Strauss, and Tetel (English); Professors Emeriti Friedl and La Barre; Assistant Research Professor Chandler (English); Assistant Professor of the Practice Luttrell; Adjunct Professor Conley

The department offers graduate work leading to the Ph.D. degree in cultural anthropology. It also participates in a program with the law school leading to a joint J.D./M.A. degree. Students' active role in development of their own research goals and design of their own plan of study, as well as their pursuit of relevant cross-disciplinary background, within and outside the department, is expected. Courses in anthropological theory and research methodology, as well as spoken and/or written competence in at least one foreign language, at the level appropriate to the planned research program, are required. The core courses include two year-long sequences: Theories in Cultural Anthropology (330S, 331S), required of first-year graduate students, and Research Seminar in Cultural Anthropology (332S, 333S), required of in the fourth and fifth semesters. Students must also take an approved methods course. Summer field research is strongly encouraged. The Guidelines for Graduate Students in the Doctoral Program in Cultural Anthropology and the Guidelines for Graduate Students in the J.D./M.A. Program fully describe these and additional requirements and the detailed steps in the student's graduate career.

For Seniors and Graduates

207S. Anthropology and History. Recent scholarship that combines anthropology and history, including culture history, ethnohistory, the study of mentalité, structural history, and cultural biography. The value of the concept of culture to history and the concepts of duration and event for anthropology. Prerequisite: major in history, one of the social sciences, or comparative area studies; or graduate standing. C-L: History 210S. 3 units. *Reddy*

211S. Ethnography of Communication. History of the mutual influence of linguistics and anthropology leading to the development of ethnography of speaking, ethno-science, structuralism, and sociolinguistics. Topics vary each semester. Prerequisite: Cultural Anthropology 107 or 119. 3 units. *Apte or O'Barr*

214. Postmodernism and the Problem of Representation. How postmodernism has shaped recent anthropological discourse. Analysis of the premises of postmodernist epistemology and identification of key issues such as truth, authority, and power that are raised by postmodernist critiques of ethnographic representation. Examination of both traditional and experimental ethnographies. 3 units. *Ewing*

215S. The Anthropology of Women: Theoretical Issues. Topic to be selected each semester from: gender ideology, women and work, gender inequality, the history of feminist anthropology, or others. C-L: Women's Studies. 3 units. *Luttrell, Quinn, or Starn*

216S. Gender, Race, and Class. Gender, race, and class as theoretical constructs and lived experiences. Analytical frameworks include social history, discourse analysis, critical theory, cultural studies, and feminist theories. Consent of instructor required. 3 units. *Luttrell*

217. Culture Versus Nature? History and Ecology in Anthropology. Historical and evolutionary approaches to the ways that human cultures and natural environments have modified and constrained one another; focus on technologies rather than on national or international environmental policy. Consent of instructor required. 3 units. *Staff*

234S. Political Economy of Development: Theories of Change in the Third World. See C-L: Political Science 234S; also C-L: History 234S and Sociology 234S. 3 units. *Staff*

250S. Culture and Discourse. Theoretical approach to culture and methods for the investigation of culture through analysis of discourse, especially interview texts. Application of this approach and these methods to the study of a domain of American culture. 3 units. *Apte, Ewing, O'Barr, Quinn, or Strauss*

251. Cognitive Anthropology. A cognitively-based theory of culture, its history, justification, substantiation through discourse analysis, application to everyday understanding, feeling and motivation, and implications for the acquisition of culture, cross-cultural variation and cultural universals in human thought. Not open to students who have taken Cultural Anthropology 151. 3 units. *Quinn or Strauss*

253S. Cross-Cultural Studies of Humor. Sociocultural basis, nature, scope, and function of humor. 3 units. *Apte*

257S. Food in Cross-Cultural Perspectives. The behavioral, institutional, linguistic, religious, and ideological aspects in relation to the production, distribution, and consumption of food within and across cultures. 3 units. *Apte*

258S. Theories of Symbolism. Influential interpretations of symbols, what they do, and how they do it. The relationship of language to symbolism and symbolism to power. Prerequisites: junior/senior status and at least two courses in cultural anthropology, or graduate standing. 3 units. *Ewing*

261. Religion: Tradition and Cultural Innovation. Analysis of anthropological approaches to religion, with an emphasis on how these theories account for conflict and change as they are manifested in religious symbols and ritual action. 3 units. *Ewing*

262S. Anthropology and Folklore. Origins, conceptualizations and theoretical orientations, methodology, and subject matter of the discipline of folklore and exploration of its similarities with and differences from sociocultural anthropology. 3 units. *Apte*

265S. Anthropological Approaches to Life History. Form and function of life history and its linkages to socio-cultural system; methodology for collecting life history in ethnographic fieldwork; textual, social-structural, and interpretive analyses of life history. 3 units. *Apte*

280S, 281S. Seminar in Selected Topics. Special topics in methodology, theory, or area. Consent of instructor required. 3 units each. *Staff*

282S. Canada. See C-L: History 282S; also C-L: Economics 282S, Political Science 282S, and Sociology 282S. 3 units. *Staff*

For Graduates

330S, 331S. Theories in Cultural Anthropology. A two-semester seminar in which the historical development of the field and its modern currents and debates are examined and discussed. Particular topics to be chosen by the instructors. 3 units each. *Staff*

332S, 333S. Research Seminar in Cultural Anthropology. Yearlong projects, from research design and formal proposal through location of research site, data collection, data analysis and theory development to write-up. Approaches, methods, and lessons appropriate to these projects. 3 units each. *Staff*

393. Individual Research in Cultural Anthropology. Supervision and guidance of A.M. thesis preparation, Ph.D. dissertation preparation, or other intensive research on a selected problem. 3 units. *Staff*

COURSES CURRENTLY UNSCHEDULED

201S. Marxism and Anthropology

208S. Postcolonial Anthropology

219. Language and Social Theory

239. Culture and Ideology

252S. American Marriage: A Cultural Approach

272S. Marxism and Feminism

284S. Feminist Theory and the Social Sciences

Economics

Professor de Marchi, *Chair* (215A Social Sciences); Professor Kimbrough, *Director of Graduate Studies* (209 Social Sciences); Professors Clotfelter, Cook, Goodwin, Grabowski, Graham, Havrilesky, Kelley, Ladd, McElroy, Moulin, Sloan, Tauchen, Tower, Trembl, Vernon, Viscusi, Wallace, Weintraub, and Yohe; Associate Professors Conrad, Kramer, Leitzel, and Marshall; Assistant Professors An, Bansal, Baumgardner, Gentry, Hamilton, Meurer, and Yang; Professors Emeriti Blackburn, Bronfenbrenner, Davies, and Kreps; Research Professors Burmeister and Coats; Adjunct Professor Gallant; Adjunct Associate Professor Zarkin; Visiting Assistant Professors Coleman and Ramachandran

The Department of Economics offers graduate work leading to the A.M. and Ph.D. degrees. Among the undergraduate courses of distinct advantage to the graduate student in economics are statistics, economic theory, and basic courses in mathematics and social sciences other than economics. Advanced work in mathematics or statistics is very useful.

Requirements for the Ph.D. degree in economics include courses in economic theory and econometrics in the first year. By the beginning of the third year, the student must have passed a core examination in economic analysis. In addition, a student must obtain certification in three fields, one of which may be in an outside minor. The student may select from advanced economic theory, health economics, history of political economy, economic development, economic history, international economics, money and banking, labor economics, public finance, industrial organization, econometrics, Soviet economics, and certain fields outside the economics department (e.g., finance, resource and environmental economics, statistics, or demography). Course work for the Ph.D. degree should be completed in five or six semesters of residence.

For Seniors and Graduates

205S. Advanced Monetary Theory and Policy. The theory of monetary policy from Keynesian, neoclassical and classical perspectives. Public choice and political economy approaches to monetary policy. The term structure interest rates. Portfolio theory. The theory of the financial services firm. Theories of financial regulatory policy. Prerequisites: Economics 153 and Statistics 10D. 3 units. *Havrilesky*

206S. Regulation and Industrial Economics. Analysis of industrial competition and performance in industries such as automobiles, telephones, cable TV, airlines, pharmaceuticals, tobacco, and health care services. Analysis of the efficiency of regulation and other public policy programs. Prerequisites: Economics 149 and statistics. 3 units. *Grabowski*

207. Models of Conflict and Cooperation. Cooperative and noncooperative game theory with applications to trading, imperfect competition, cost allocation, and voting. Prerequisites: Economics 149 and Mathematics 31. 3 units. *Moulin*

207S. Models of Conflict and Cooperation. Seminar version of 207. Prerequisites: Economics 149 and Mathematics 31. 3 units. *Moulin*

208S. Economics of the Family. Economic functions of families including home production gains from marriage, the demand for children, marriage and divorce, child support and alimony, labor supplies of women and men, the distribution of resources within families ("rotten kid theorems" and cooperative and noncooperative games). Applications to marriage and divorce law, day care, U.S. welfare policy, mortality, and farm efficiency in developing nations. Prerequisites: Economics 149 and Statistics. 3 units. *McElroy*

215S. Applied Cost Benefit Analysis. The principles of economic cost benefit analysis applicable to circumstances in which market valuations do not provide adequate measures of social desirability. Socially relevant prices for labor, capital, energy, materials, foreign exchange, and valuation of public goods. Development of analysis for individual projects, extended to cover economic policies. Prerequisite: Economics 149. 3 units. *Staff*

216S. Economics of Education. Topics include investment in human capital, return to and demand for education, the production function for schooling, public expenditures on schools, effectiveness of private and public schools, the distribution of public educational expenditures, public financing of higher education, inflation in college costs, and labor markets for teachers and professors. Emphasis on students' research projects. Prerequisite: Economics 149 or Public Policy Studies 110. C-L: Public Policy Studies 216S. 3 units. *Clotfelter*

218. Macroeconomic Policy. Does not count for undergraduate economics major requirements. See C-L: Public Policy Studies 218. 3 units. *Leitzel or McElroy*

219S. Economic Problems of Underdeveloped Areas. Analysis of underdeveloped countries with attention to national and international programs designed to accelerate development. Prerequisite: Economics 149 or consent of instructor. 3 units. *Kelley or Wallace*

220S. Computer Modeling for Policy Analysis. Introduction to the use of computer techniques in economic policy evaluation; policy applications to international economics, public finance and development economics; computer analysis of linearized and nonlinear models. Students required to complete a major modeling project. Prerequisites: Economics 149 and Economics 154. 3 units. *Tower*

225S. Games and Information. Non-cooperative game theory with emphasis upon incomplete/imperfect information and incentive contracting. Applications to insurance (deductibles, coinsurance), labor (piece rates, sharecropping, profit sharing), real estate (commission sales), and law (contingent contracts). Prerequisites: Economics 149 and statistics. 3 units. *Graham*

232. Microeconomics: Policy Applications. Does not count for undergraduate economics major requirements. See C-L: Public Policy Studies 232. 3 units. *Conrad or Ladd*

234. Japanese Economy and Its History. Japanese economic development since the end of isolation, in the mid-nineteenth century. Not open to students who have had Economics 134. Prerequisite: one course in economics or Far Eastern history. 3 units. *Bronfenbrenner*

239. Introduction to Econometrics. Data collection, estimation, and hypothesis testing. Use of econometric models for analysis and policy. (Same as Economics 139 but requires additional term paper; not open to students who have taken Economics 139.) Prerequisites: Economics 2D or 2S or 52D and Mathematics 32 or equivalent and Statistics 10D or equivalent. 3 units. *McElroy, Tauchen, or Wallace*

240. Comparative Economic Systems. Analysis and comparison of basic economic systems; market versus centrally planned economies; decision making, information, property rights (income and control), and incentives. Western industrialized market economies compared with Soviet-type command economies. Analysis of change, reforms, and of economic problems of systems transformation. Not open to students who have taken Economics 140. Prerequisites: Economics 1D or 51D, and 2D or 2S or 52D. 3 units. *Treml*

242S. Chinese Economy in Transition. Evolution of the Chinese economy since 1949. Exposition of alternative economic systems, the commune, incentive problems and state enterprises. Analysis of recent reforms and their effects on economic efficiency: agricultural growth, changes in ownership structures, financial markets, reforms and inflation, privatization, gradualism and shock treatment. Through a research project students develop expertise in one aspect of the Chinese economy. (Same as Economics 142S but requires additional paper; not open to students who have taken Economics 142 or 142S.) Prerequisites: Economics 1D or 51D, and 2D or 2S or 52D. 3 units. *Yang*

244. Education, Development, and Growth. The basic elements of human capital theory and its application to economic growth and development. Topics include human capital investment, life-cycle earnings, impact of education on farm efficiency, migration, national income accounting, and models of endogenous growth. Data from the United States and other countries are used to test theoretical implications. (Same as Economics 144 but requires additional work; not open to students who have taken Economics 144.) Prerequisites: Economics 149, Economics 154, and Statistics 110B. 3 units. *Yang*

249. Microeconomics. Cost and supply considerations in price theory; the demand for factors of production. The allocation of resources in the context of competitive and monopolistic market structures. (Similar to Economics 149 but at a more advanced level; not open to students who have taken Economics 149.) 3 units. *Staff*

250S. Modern Economic Thought. Selective survey of themes in economic thinking since 1936, including the role of empirical work and of formalization. Prerequisites: Economics 149, 154, and Statistics 10D or consent of instructor. 3 units. *De Marchi or Weintraub*

251S. Regulation of Vice and Substance Abuse. Prerequisite: Economics 149 or Public Policy Studies 110. See C-L: Public Policy Studies 251S. 3 units. *Cook*

253. Econometric Methods. Econometric and statistical methods for applied economic research. Topics include multivariate regression, hypothesis testing, mean square error criteria, and related subjects. Prerequisites: Economics 139 or 239, Economics 149, or equivalents. Calculus and matrix algebra recommended. 3 units. *Wallace*

254. Macroeconomics. Concepts and measurement of national income and expenditures, employment, interest rates, and price levels; the theoretical determination of these aggregates; applications of macroeconomic theory to business cycles and economic growth. (Similar to Economics 154 but at a more advanced level; not open to students who have taken Economics 154.) 3 units. *Staff*

258. Financial Markets and Investments. The tools learned in microeconomics, macroeconomics, basic mathematics, and statistics applied to problems in financial economics. A blend of pure economic theory, an investigation of financial data, and practical applications using personal computers. Not open to students who have had Economics 158. Prerequisites: Economics 149, Economics 154, and a statistics course—preferably Statistics 110 or 210. 3 units. *Burmeister*

259S. State and Local Public Finance. Prerequisite: Public Policy Studies 217 or equivalent. See C-L: Public Policy Studies 259S. 3 units. *Ladd*

260. Economic Policy Analysis of Nonrenewable Resources. Prerequisite: Economics 149, Public Policy Studies 110, or Public Policy Studies 232. See C-L: Public Policy Studies 260. 3 units. *Conrad*

261. Evaluation of Public Expenditures. Not open to students who have taken Economics 285. See C-L: Public Policy Studies 261; also C-L: Environment 272. 3 units. *Conrad*

262S. Seminar in Applied Project Evaluation. Prerequisite: Economics 285 or Public Policy Studies 261. See C-L: Public Policy Studies 262S. 3 units. *Conrad*

265. International Trade and Finance. Fundamental principles of international economic relations. The economic basis for international specialization and trade, the economic gains from international trade and investment, the balance of payments, international finance, and the international monetary system. Prerequisites: Economics 149 and 154. 3 units. *Kimbrough or Tower*

266S. Current Issues in International Economics. Emphasis on individual research projects. Prerequisite: Economics 165, 265, or consent of instructor. 3 units. *Kimbrough or Tower*

269. Microeconomic Analysis. The basic tools for using microeconomic analysis to address practical economic problems. Topics include consumption, production, externalities, partial equilibrium, and general equilibrium. Applications drawn from labor markets, public goods, cost/benefit analysis, and optimal taxation. The level of the course is between intermediate microeconomics (Economics 149/249) and the core Ph.D. microeconomics sequence (Economics 301/302). 3 units. *Yang*

270L. Resource and Environmental Economics. Includes laboratory. Prerequisite: introductory course in microeconomics. See C-L: Environment 270L; also C-L: Public Policy Studies 272L. 4 units. *Kramer*

271. Behavioral and Experimental Economics. The relationship between actual behavior and economic models. Topics include individual decision-making behavior, game theory, and the role of market institutions. The interaction of economic and psychological theory. Students will have the opportunity to participate in, and conduct,

economic experiments. (Same as Economics 171 but requires an additional paper; not open to students who have taken Economics 171.) Prerequisite: Economics 149 or consent of instructor. 3 units. *Staff*

272. Economic Analysis of Resource and Environmental Policies. Prerequisite: Environment 270L or equivalent; Economics 149 recommended. See C-L: Environment 271. 3 units. *Staff*

273. Economics of Organization and Management. Coordination and motivation issues within a corporation along with the internal design and dynamics of organizations. Topics include the structure of employment contracts, performance incentives, and the pricing of financial assets. (Same as Economics 173 but requires additional paper; not open to students who have taken Economics 173.) Prerequisite: Economics 149. 3 units. *Marshall or Meurer*

280S. Fundamentals of Political Economy. See C-L: Political Science 270S. 3 units. *Aldrich, Bianco, or Niou*

282S. Canada. See C-L: History 282S; also C-L: Cultural Anthropology 282S, Political Science 282S, and Sociology 282S. 3 units. *Staff*

286S. Economic Policy-Making in Developing Countries. See C-L: Public Policy Studies 286S. 3 units. *Conrad or Ramachandran*

287. Public Finance. Economic aspects of the allocative and distributive role of government in the economy, the incidence and efficiency of taxation, the effects of taxation on behavior, and analysis of major government spending programs. Not open to students who have had Economics 187. (Taught concurrently with Economics 187 but requires additional graduate-level work.) Prerequisite: Economics 149. 3 units. *Gentry*

288S. Current Issues in United States Federal Tax Policy. Evaluation of the equity and efficiency of United States tax policy. Topics include: (1) personal consumption versus income taxation and (2) restructuring the taxation of corporate income. Emphasis on the effects of taxes on savings, investment, and the international economy. Prerequisite: Economics 149 or consent of instructor. C-L: Public Policy Studies 288S. 3 units. *Gentry*

292S. Issues in the Transition of Economic Systems. 3 units. *Leitzel*

293. Soviet Economic History. From 1917 through the present. Foundations of the command economy—rejection of markets, central planning, industrialization, collectivization of agriculture; economic reforms and search for economic efficiency. Gorbachev's perestroika and the dissolution of the Soviet Union. 3 units. *Trembl*

294S. Soviet Economic System. Economic planning and administration in the Soviet Union. Theoretical and applied problems of resource allocation, economic development, and optimal micro decision making in a nonmarket economy. Gorbachev's perestroika, search for a new model, and the collapse of the Soviet system. 3 units. *Trembl*

For Graduates

301. Microeconomic Analysis I. Review of contemporary theory relating to consumer choice, production, the firm, and income distribution in competitive and imperfectly competitive markets. Restricted to Ph.D. students in Economics except with consent of instructor and Director of Graduate Studies. 3 units. *Marshall*

302. Microeconomic Analysis II. A continuation of Economics 301 with emphasis on analyses of consumer behavior, general equilibrium, welfare economics, and capital theory. Prerequisite: Economics 301. 3 units. *Graham*

303. Microeconomic Analysis III. A discussion of the formal models of economic justice with the tools of cooperative games and social choice. Topics include cost-sharing formulas, fair division, natural monopolies, public goods, collective preferences and utilities, and implementation theory. Prerequisites: Economics 301 and 302. 3 units. *Moulin*

304. Advanced Macroeconomics. Advanced topics in macroeconomics with some emphasis on computation and econometric analysis. Topics include real business cycle theory, endogenous growth theory, monetary theory, optimal monetary and fiscal policy and time consistency. 3 units. *Kimbrough*

305. Monetary Theory and Policy. Same topics as Economics 205S but with additional graduate level work. Prerequisite: Economics 304. 3 units. *Havrilesky*

309. Trade and Development Theory. Theory of international trade and trade policy as it affects the structure and growth of individual economies, with emphasis on developing countries. Comparative advantage, factor proportions explanation of trade, infant industry and other arguments for protection, interactions of exchange rate and trade policy, and special issues relating to primary commodities are examined. 3 units. *Staff*

311, 312. History of Political Economy. A detailed review of the development of economic theory, the tools of economic analysis, and economics as a science, together with an analysis of the circumstances affecting this development. 3 units each. *Coats, De Marchi, Goodwin, or Weintraub*

313, 314. Seminar in Economic Theory. Prerequisite: Economics 301 or equivalent. 3 units each. *Weintraub*

315. Noncooperative Game Theory. A self-contained presentation of the main noncooperative concepts: dominant strategies, Nash equilibrium, subgame perfect equilibrium. Introduction to mixed and correlated strategies and the Bayesian equilibrium for games of incomplete information. Examples include oligopolistic competition, auctions, bargaining, and voting. C-L: Political Science 315 and Statistics 386. 3 units. *Meurer or Moulin*

316. Seminar in Economics of Soviet-Type Socialism. Selected topics in analysis of theoretical and institutional framework of Soviet economic system, such as markets versus plan, optimizing techniques in planning, price determination, balanced economic development, and ideology and economic policy. 3 units. *Trembl*

317. Development Economics I. Historical, empirical, and theoretical topics in development economics. 3 units. *Kelley*

318. Quantitative Development Economics. Selected topics in development economics with emphasis on empirical techniques. Topics include economic growth, income distribution, labor markets, human capital fertility, health, and their relationship with structural adjustment. 3 units. *Staff*

319. Seminar in the Theory and the Problems of Economic Growth and Change (Development Economics II). Links between aid, financial markets, and real investment in an open economy stressing tariff protection and capital controls (internal and external). Economic policy-making using market solutions and/or planning models (input-output, linear programming, and computable general equilibrium). 3 units. *Staff*

320. Macroeconomic Analysis I. Intertemporal models of consumption and labor supply; implications of these models for the behavior of macroeconomic aggregates, fiscal policy, and monetary policy; money demand and inflation; economic growth.

Restricted to Ph.D. students in Economics except with consent of instructor and Director of Graduate Studies. 3 units. *Kimbrough*

322. Macroeconomic Analysis II. Further analysis of topics treated in Economics 320. Optimal economic growth; business cycles. Issues in economic policy. Prerequisite: Economics 320. 3 units. *Kimbrough*

326. Stochastic Macroeconomics. Advanced topics in macroeconomics with an emphasis on empirical macroeconomics and the interrelationship between economic theory and empirical work in macroeconomics. Topics include the interpretation of macroeconomic time series, formulating and testing models of asset pricing and market efficiency, solution and estimation of rational expectations models, vector autoregression models, and policy evaluation with empirical macroeconomic models. 3 units. *Bansal or Tauchen*

329. Public Economics I. Analysis of normative and positive models of the incidence and efficiency of taxation, and the effects of taxation on individual and firm behavior. 3 units. *Gentry*

330. Public Economics II. Public expenditure analysis including the analysis of externalities, benefit assessment, and risk and uncertainty. 3 units. *Viscusi*

341. Quantitative Methods. Various topics in linear algebra, advanced calculus, real analysis, statistics, econometrics, and computer programming, as relevant for Ph.D. level work in economics. Restricted to Ph.D. students in Economics except with consent of instructor and Director of Graduate Studies. Prerequisites: Economics 149 and 154; Mathematics 103, 104, or equivalent. 3 units. *Tauchen*

344. Econometrics I. Economic theory and statistics applied to analysis of economic phenomena. Matrix algebra and calculus used to develop methods for multiple regression and statistical inference. Prerequisite: Economics 249, 341, or equivalents. 3 units. *McElroy, Tauchen, or Wallace*

345. Applied Econometrics. Applications of current econometric methodology to empirical problems with an emphasis on applied microeconomics. Topics include limited dependent variable, longitudinal and panel data analysis, and duration models. Prerequisites: Economics 341 and Economics 344. 3 units. *An*

347. Econometrics II. Asymptotic theory for finite dimensional parametric models. Topics include nonlinear maximum likelihood, nonlinear regression, extremum estimators, aspects of computation, hypothesis testing, and models with limited dependent variables. Prerequisite: Economics 344. 3 units. *An or Tauchen*

348. Econometrics III. Advanced topics in econometrics including asymptotic theory, nonparametrics, and specification testing. Prerequisite: Economics 347. 3 units. *An or Tauchen*

355. Seminar in Labor Economics. 3 units. *Baumgardner or McElroy*

356. Graduate Health Economics I. Survey course designed for students considering Ph.D. research in health economics. Topics will include demand for health insurance, moral hazard, health as an investment, technological change, the principal-agent problem, occupational entry, and the supply of physician services. Prerequisites: Economics 301 and 344. 3 units. *Baumgardner or Sloan*

357. Seminar in Health Economics. Conceptual and empirical analysis of demand for health, medical services, and insurance; decisions by physicians and hospitals about price, quantity, and quality of services; technological change; and structure and performance of the pharmaceutical industry. Prerequisites: Economics 301 and 344. 3 units. *Baumgardner or Sloan*

358. Seminar in Labor Market and Related Analysis. A survey of several topics in modern labor economics including human capital, signaling, static and dynamic labor supply, household production, labor contracts, search, the theory of equalizing differences, and discrimination. 3 units. *Baumgardner or Yang*

359. Economic Analysis of Legal Issues. An exploration of diverse topics in law and economics such as property rights and externalities, tort law and optimal accident prevention, bargaining and game theory, the economics of contracts, and theories of economic justice. 3 units. *Culp or Meurer*

365. Seminar in International Trade Theory and Policy. 3 units. *Tower*

366. Seminar in International Monetary Theory. 3 units. *Kimbrough*

372. Advanced Natural Resource Economics. Methods for evaluating conservation, development, and restoration of renewable and exhaustible environmental resources. Introduction to the role of public goods and externalities in designing policies to sustain resource productivity and maintain environmental quality (developed in more detail in 373). Topics include renewable resources, exhaustible resources, intergenerational equity, property rights, and optimal control. Consent of instructor required. C-L: Environment 372. 3 units. *Staff*

373. Advanced Environmental Economics. Examination of the economic measurement of environmental benefits and damages. Consideration of economic concepts for the design of environmental policies. Topics include externality theory, public goods, contingent valuation, and hedonic models. Consent of instructor required. C-L: Environment 373. 3 units. *Kramer*

380. Graduate Economics Workshops. May be taken for multiple credit. Sections: .01 Industrial Organization and Regulation; .02 International Economics; .03 Labor Economics; .04 Macroeconomics; .05 Public Finance; .06 Economic Thought; .07 Corporate Economics; .08 Econometrics; .09 Economic Theory. 3 units each. Variable credit. *Staff*

388. Industrial Organization. Analysis of models of markets, especially oligopoly. Game theoretic models of entry deterrence and predation. Product selection and advertising and other selected topics. 3 units. *Grabowski, Marshall, Meurer, or Vernon*

389. Seminar in Industrial and Governmental Problems. Criteria for evaluating industrial performance. Antitrust, policy toward innovation, natural monopoly regulation, and regulation of selected industries. 3 units. *Grabowski, Marshall, or Vernon*

390. Economics of Auctions, Procurements, and Bargaining. Study of allocation mechanisms where offers are considered simultaneously and sequentially. Special emphasis on the distinction between allocation mechanisms from the viewpoint of sellers and buyers. 3 units. *Marshall*

397, 398. Directed Research. 3 units each. *Staff*

COURSES CURRENTLY UNSCHEDULED

231S. Economic Development in Latin America

235. The Economics of Crime

248. Advanced Theory and Methods in Econometrics

307. Quantitative Analysis I

308. Quantitative Analysis II

321. Theory of Quantitative Economic Policy

323. Income Distribution Theory

324, 325. Economics of the Law

401. Seminar on the British Commonwealth

402. Interdisciplinary Seminar in the History of the Social Sciences

RELATED COURSES IN OTHER DEPARTMENTS

Courses in related fields may be selected from anthropology, computer science, environmental studies, history, mathematics, philosophy, political science, public policy sciences, sociology, and statistics or from an area that complements the candidate's area of research interests in economics.

See the Center for Demographic Studies in the chapter "Special and Cooperative Programs" for further information.

Engineering

Earl H. Dowell, Sc.D., *Dean* (305 Teer Engineering Library Building); Charles P. Yohn, B.S.E., *Associate Dean, Director of Development* (305 Teer Engineering Library Building)

The School of Engineering offers programs of study and research leading to the M.S. and Ph.D. degrees with a major in biochemical, biomedical, civil and environmental, electrical, and mechanical engineering and materials science. These programs are designed to provide: (1) development of depth and breadth in mathematics, computer science, the basic physical sciences, the life sciences where appropriate, and the engineering sciences; (2) mastery of an advanced body of knowledge in the candidate's chosen field of specialization or research; (3) experience in the art of engineering, including strong elements of intuition, imagination, and judgment; and (4) performance of original research which, in the case of the M.S. degree, demonstrates the ability to advance knowledge in the area of professional study and, in the case of the Ph.D. degree, makes a significant contribution to the research literature through publication in a leading professional journal in the field. Engineering graduate students are expected to participate in seminars appropriate to their fields of study. A minimum of 30 units of earned graduate credit beyond the bachelor's degree is required for the M.S. degree: 12 in the major, 6 in related minor work (usually mathematics or natural science), 6 in either the major or minor subject or in other areas approved by the major department, and 6 for a research-based thesis. A nonthesis option requiring 30 units of course credit is available. Each of the departments imposes additional requirements in the exercise of this option. There is no language requirement for this degree. A minimum of 60 units of earned graduate credit beyond the bachelor's degree is required for the Ph.D. degree. In civil and environmental engineering, 12 units of course work beyond the master's degree are required to be in the major field, 6 in a related minor field, and 6 in either the major or minor field; in electrical engineering, 24 units are required in the major field and 12 units in a related minor field (often mathematics or natural science), 12 in either the major or minor subject or other areas approved by the major department, and 12 for a research-based dissertation. In biomedical and mechanical engineering and materials science there are no specific course requirements; each program is planned to meet individual needs. Doctoral students are required to pass qualifying and preliminary examinations which may be either written, oral, or a combination of written and oral components, at the discretion of the committee and the department.

In addition, the School of Engineering and the Fuqua School of Business offer an MBA/MS Joint-Degree Program. Further details about this program may be obtained from: Professor Miguel Medina, Director, MBA/MS Joint-Degree Program, Department of Civil and Environmental Engineering.

ENGINEERING

221. Computational Linear Algebra. Linear vector spaces of real and complex n -tuples, norms, metrics, inner-products, basis vectors, rank and dimensionality; matrices as linear maps, rank and nullity; particular and general solutions of $Ax=b$; factorization of matrices by successive transformations; solution of $Ax=b$ by direct and iterative methods; special and general eigenvalue problems; diagonalization and tridiagonalization by similarity transformations; power methods; and computational complexities, storage requirements, convergence characteristics, error propagation, and the mathematical basis of the studied algorithms. Prerequisites: Mathematics 111 or equivalent, and knowledge of any algorithmic programming language. 3 units. *S. Utku*

COURSES CURRENTLY UNSCHEDULED

222. Computer Solutions of Ordinary and Partial Differential Equations

Biomedical Engineering

Professor McElhaney, *Chair* (136 Engineering); Associate Professor Trahey, *Director of Graduate Studies* (267 Engineering Annex); Professors Barr, Clark, Hammond, Jaszczak, Katz, Nolte, Plonsey, von Ramm, and Wolbarsht; Associate Professors Burdick, Floyd, Reichert, and S. Smith; Assistant Professors Cusma, Henriquez, Jacobs, Krassowska, Myers, Truskey, and Wolf; Associate Research Professor Paspipoularides

Biomedical engineering is the discipline in which the physical, mathematical, and engineering sciences and associated technology are applied to biology and medicine. Contributions range from modeling and simulation of physiological systems through experimental research to solutions of practical clinical problems. The goal of the graduate program in biomedical engineering is to combine training in advanced engineering, biomedical engineering, and the life sciences so that graduates of the program can contribute at the most advanced professional level. The doctoral dissertation should demonstrate significant and original contributions to an interdisciplinary topic, accomplished as an independent investigator. The major, current research areas are: biochemical engineering, biofluid mechanics, biomechanics, biomedical materials, biomedical modeling, biosensors, biotechnology, data acquisition and processing, medical imaging, and electrophysiology. Every biomedical engineering graduate student is required to serve as a teaching assistant as part of the graduate training.

201L. Electrophysiology. The electrophysiology of excitable cells from a quantitative perspective. Topics include the ionic basis of action potentials, the Hodgkin-Huxley model, impulse propagation, source-field relationships, and an introduction to functional electrical stimulation. Students choose a relevant topic area for detailed study and report. Not open to students who have taken Biomedical Engineering 101 or equivalent. 3 units; 4 units with laboratory. Variable credit. *Barr or Henriquez*

204. Measurement and Control of Cardiac Electrical Events. Design of biomedical devices for cardiac application based on a review of theoretical and experimental results from cardiac electrophysiology. Evaluation of the underlying cardiac events using computer simulations. Examination of electrodes, amplifiers, pacemakers, defibrillators, and related computer apparatus. Prerequisites: Biomedical Engineering 101 and 164 or equivalents. 3 units. *Wolf*

205L. Microprocessors and Digital Instruments. Design of microcomputer-based devices including both hardware and software considerations of system design. Primary emphasis on hardware aspects, including a progression through initial design, prototype construction in the laboratory, testing of prototypes to locate and correct faults, and final design evaluation. Evaluation includes examination of complexity, reliability, and cost. Design and construction oriented toward biomedical devices or instruments that

include dedicated microcomputers, usually operating in real time. Prerequisites: Engineering 51L and Biomedical Engineering 163L, 164L or equivalents. 4 units. *Barr or Hammond*

207. Transport Phenomena in Biological Systems. An introduction to the modeling of complex biological systems using principles of transport phenomena and biochemical kinetics. Topics include the conservation of mass and momentum using differential and integral balances; rheology of Newtonian and non-Newtonian fluids; steady and transient diffusion in reacting systems; dimensional analysis; homogeneous versus heterogeneous reaction systems. Biomedical and biotechnological applications are discussed. C-L: Civil Engineering 207 and Mechanical Engineering 207. 3 units. *Truskey*

208. Theoretical and Applied Polymer Science. See C-L: Mechanical Engineering 211. 3 units. *H. Clark*

209. Kinetics and Reactor Design. Introduction to chemical and biochemical reaction stoichiometry and kinetics. Concepts of elementary reactions, reaction sequences, steady-state approximations, and rate-limiting steps. Ideal and non-ideal isothermal and non-isothermal reactor design and analysis. Homogeneous and heterogeneous reactor concepts, multiplicity, mass transfer limitations. Prerequisite: Mathematics 111 or consent of instructor. C-L: Civil Engineering 209. 3 units. *Staff*

211. Theoretical Electrophysiology. Advanced topics on the electrophysiological behavior of nerve and striated muscle. Source-field models for single-fiber and fiber bundles lying in a volume conductor. Forward and inverse models for EMG and ENG. Bidomain model. Model and simulation for stimulation of single-fiber and fiber bundle. Laboratory exercises based on computer simulation, with emphasis on quantitative behavior and design. Readings from original literature. Prerequisite: Biomedical Engineering 101 or 201 or equivalent. 4 units. *Barr or Plonsey*

212. Theoretical Electrocardiography. Electrophysiological behavior of cardiac muscle. Emphasis on quantitative study of cardiac tissue with respect to propagation and the evaluation of sources. Effect of junctions, inhomogeneities, anisotropy, and presence of unbounded extracellular space. Bidomain models. Study of models of arrhythmia, fibrillation, and defibrillation. Electrocardiographic models and forward simulations. Laboratory exercises based on computer simulation, with emphasis on quantitative behavior and design. Readings from original literature. Prerequisite: Biomedical Engineering 101 or 201 or equivalent. 4 units. *Barr or Plonsey*

215. Biomedical Materials and Artificial Organs. Chemical structures, processing methods, evaluation procedures, and regulations for materials used in biomedical applications. Applications include implant materials, components of ex vivo circuits, and cosmetic prostheses. Primary emphasis on polymer-based materials and on optimization of parameters of materials which determine their utility in applications such as artificial kidney membranes and artificial arteries. Prerequisite: Biomedical Engineering 83L, Engineering 83L or Chemistry 151L or consent of instructor. C-L: Mechanical Engineering 215. 3 units. *H. Clark or Reichert*

216. Transport Phenomena in Cells and Organs. Applications of the principles of mass and momentum transport to the analysis of selected processes of biomedical and biotechnological interest. Emphasis on the development and critical analysis of models of the particular transport process. Topics include: reaction-diffusion processes, transport in natural and artificial membranes, dynamics of blood flow, pharmacokinetics, receptor-mediated processes and macromolecular transport, normal and neoplastic tissue. Prerequisite: Biomedical Engineering 207 or equivalent. 3 units. *Truskey*

222. Principles of Ultrasound Imaging. Propagation, reflection, refraction, and diffraction of acoustic waves in biologic media. Topics include geometric optics, physical

optics, attenuation, and image quality parameters such as signal-to-noise ratio, dynamic range, and resolution. Emphasis is placed on the design and analysis of medical ultrasound imaging systems. Prerequisites: Physics 52L and Mathematics 111 or equivalents. 3 units. *von Ramm*

223. Cellular and Integrative Cardiovascular Physiology and Biophysics. Electrical and mechanical properties of the heart at the cellular and organ levels; reflex control of cardiac output; the heart as an endocrine organ; interaction between heart, kidney, and lung; comparative cardiac physiology. Prerequisites: Cell Biology 203 or equivalent and Physics 52L or equivalent; consent of instructor or graduate status. C-L: Cell Biology 223. 3 units. *Benjamin and staff*

230. Biomechanics. Kinematic models of human motions, mechanical properties of bone and soft tissues, load directed growth mechanisms, human tolerance to impact and vibration, head injury criteria applied to helmet design. 3 units. *McElhanev*

231. Orthopaedic Biomechanics. Biomechanics of hard and soft tissues: nonlinear viscoelastic behavior of tendon and ligament; poroelastic behavior of cartilage and meniscus; continuum modeling of bone. Emphasis will be placed on experimental techniques used to evaluate these tissues. Student seminars on topics in applied biomechanics will be included. Prerequisites: Biomedical Engineering 110L or Engineering 75L or equivalent, and Biomedical Engineering 83 or Engineering 83L or equivalent. 3 units. *Myers*

233. Modern Diagnostic Imaging Systems. The underlying concepts and instrumentation of several modern medical imaging modalities. Review of applicable linear systems theory and relevant principles of physics. Modalities studied include X-ray radiography (conventional film-screen imaging and modern electronic imaging), computerized tomography (including the theory of reconstruction), and nuclear magnetic resonance imaging. Consent of instructor required. 3 units. *Floyd*

235. Acoustics and Hearing. The generation and propagation of acoustic (vibrational) waves and their reception and interpretation by the auditory system. Topics under the heading of generation and propagation include free and forced vibrations of discrete and continuous systems, resonance and damping, and the wave equation and solutions. So that students may understand the reception and interpretation of sound, the anatomy and physiology of the mammalian auditory system are presented; and the mechanics of the middle and inner ears are studied. Prerequisites: Physics 52L and Mathematics 111 or equivalents. 3 units. *Trahey*

237. Biosensors. Biosensors defined as the use of biospecific recognition mechanisms in the detection of analyte concentration. The basic principles of protein binding with specific reference to enzyme-substrate, lectin-sugar, antibody-antigen, and receptor-transmitting binding. Simple surface diffusion and absorption physics at surfaces with particular attention paid to surface binding phenomena. Optical, electrochemical, gravimetric, and thermal transduction mechanisms which form the basis of the sensor design. Prerequisites: Biomedical Engineering 215 and consent of instructor. 3 units. *Reichert*

241. Artificial Intelligence in Medicine. Basic concepts of artificial intelligence (AI) and in-depth examination of medical applications of AI. Knowledge of heuristic programming; brief examination of classic AI programming languages (LISP and PROLOG) and AI programming; rule-based systems and cognitive models. 3 units. *Hammond*

243. Introduction to Medical Informatics. An in-depth study of the use of computers in biomedical applications. Hardware, software, and applications programming. Data collection, analysis, and presentation studied within application areas such as monitoring, medical records, computer-aided diagnoses, computer-aided instruction,

M.D.-assistance programs, laboratory processing, wave form analysis, hospital information systems, and medical information systems. 3 units. *Hammond*

244. Mathematical Models of Physiological Systems. Mathematical modeling and computer simulation of physiological and other biomedical systems. Formulation of quantitative models of physiological processes using methods drawn from a variety of engineering disciplines including transport phenomena, feedback control, and continuum mechanics. Digital techniques for the solution of coupled nonlinear equations, emphasizing systems of ordinary and partial differential equations. Selected readings from the literature covering current models of cardiovascular, renal, neural, respiratory, and sensory systems. Prerequisite: Mathematics 111 or equivalent. 3 units. *Pasipoularides*

250. Cardiovascular Mechanics. Mechanical principles and their applications in the human circulatory system. The coupling of solid and fluid behavior in cardiovascular organs is emphasized. Topics include: gravity and the circulation, kinematics of blood flow and circulatory volume balances, peripheral resistance, wall stresses and deformations, cardiac cycle and cardiac work, circulatory wave propagation, unsteady velocity profiles and boundary layers. Special student projects involve the design of diagnostic and therapeutic instruments and devices for cardiovascular applications. Prerequisites: Biomedical Engineering 110 and Mathematics 111 or equivalent. 3 units. *Pasipoularides*

255. Safety of Medical Devices. Safety of medical devices such as prosthetic heart valves and silicone breast implants. Engineering analysis of the safety of biomedical instrumentation in the context of the regulations of the U.S. Food and Drug Administration. Engineering performance standards and FDA requirements for clinical trials for selected medical devices such as medical diagnostic ultrasound, surgical lasers, and prosthetic heart valves. Students will prepare a mock application for FDA premarket approval to demonstrate safety of a selected medical device. Prerequisite: Biomedical Engineering 164L or equivalent or consent of instructor. 3 units. *S. Smith*

264. Medical Instrument Design. General principles of signal acquisition, amplification processing, recording, and display in medical instruments. System design, construction, and evaluation techniques will be emphasized. Methods of real-time signal processing will be reviewed and implemented in the laboratory. Each student will design, construct, and demonstrate a functional medical instrument and collect and analyze data with that instrument. Formal write-ups and presentations of each project will be required. Prerequisite: Biomedical Engineering 164 or equivalent or senior standing. 3 units. *Trahey*

265. Advanced Topics in Biomedical Engineering. Advanced subjects related to programs within biomedical engineering tailored to fit the requirements of a small group. Consent of instructor required. Variable credit. *Staff*

For Graduates

320. Medical Ultrasound Transducers. A study of the design, fabrication and evaluation of medical ultrasound transducers. Topics include wave propagation in piezoelectric crystals, Mason and KLM circuit models, linear arrays and two-dimensional arrays, piezoelectric ceramic/epoxy composite materials, piezoelectric polymers, and photo-acoustic materials. Consent of instructor required. 3 units. *S. Smith*

330. Finite Element Method for Biomedical Engineers. The finite element method with an emphasis on applications to biomedical engineering. Several detailed examples illustrate the finite element analysis process, which includes setting up a mathematical description of the problem, putting it into a form suitable for finite element solution, solving the discretized problem, and using advanced computer codes to check the correctness of the numerical results. Consent of instructor required. 3 units. *Staff*

333. Biomedical Imaging. A study of the fundamentals of information detection, processing, and presentation associated with imaging in biology and medicine. Analysis of coherent and incoherent radiation and various image generation techniques. Design and analysis of modern array imaging systems as well as systems. 3 units. *von Ramm*

399. Special Readings in Biomedical Engineering. Individual readings in advanced study and research areas of biomedical engineering. Approval of director of graduate studies required. 1 to 3 units each. Variable credit. *Staff*

COURSES CURRENTLY UNSCHEDULED

202. Biomedical Transfer Processes

206L. Microprocessors and Digital Instruments

311. Inverse Models

Civil and Environmental Engineering

Professor Petroski, *Chair* (121 Engineering); Associate Professor Peirce, *Director of Graduate Studies* (139A Engineering); Professors Haff, Melosh, S. Utku, Vesilind, and J. F. Wilson; Associate Professors Hueckel, Medina, Pas, and Reckhow; Assistant Professors Faust, Jacobs, Laursen, and Virgin; Professor Emeritus Brown; Research Associate Professor Biswas; Adjunct Associate Professor B. Utku

Civil and environmental engineering extends across mathematics, the natural sciences including physics, biology, and chemistry, and the social and management sciences. Civil and environmental engineers develop expertise in these disciplines to research, plan, design, construct, and analyze solutions to technical problems faced throughout society. These solutions vary widely in nature, size, and scope: space satellites and launching facilities, environmental systems and controls to protect public health, nuclear and conventional power generators, bridges, dams, buildings, tunnels, highways, and mass transportation systems.

Six major specialty areas at Duke enjoy national and international reputations for quality

- **engineering mechanics:** the study of the behavior of solid and fluid systems under a broad range of design and extreme loading conditions; the development of new computational paradigms for complex mechanical systems;
- **environmental engineering:** the study of the disposal of hazardous waste, solid waste processing, pollutant fate and transport in water, soil, and air, biotechnology, and water and wastewater treatment to protect public health and the environment;
- **geomechanics:** the study of the response of soils and rocks to mechanical, hydraulic, and environmental loadings and its mathematical modeling;
- **structural engineering:** the study of behavior of structures and materials, the safe and economical design of engineered structures, fundamentals of adaptive structures, use of adaptive structures technology in precision and vibration control of space structures, and vibration inhibition in buildings subjected to seismic and wind excitations;
- **transportation and systems engineering:** the modeling and analysis of large and complex mechanical, environmental, and human systems to support decision making and policy analysis, complex decision making, pattern formation, and nonlinearity using computer simulation;
- **water resources engineering:** the analysis of use, preservation, and management of surface and groundwater supplies.

Environmental mechanics is as an interdisciplinary area of interest to many of our faculty. The emphasis is on mechanics of chemically and/or biologically interacting

solids and liquids, including transport phenomena in porous media, environmental geomechanics, degradation and aging of structures and materials due to chemically aggressive environments, and natural and engineered environmental processes including sedimentation, coagulation, mixing, sludge processing, water and wastewater treatment, and barriers to prevent pollutant transport.

Laboratory facilities in the department are competitive with those found in major research universities worldwide. Computers are used for data collection and analysis, and a wide range of physical, chemical, and biological testing equipment is used in the laboratory for teaching and research activities. Advanced-graphics computer systems are also available. Project-specific measurement equipment is designed, constructed, and applied in many of the specialty areas mentioned above.

Under the Reciprocal Agreement with Neighboring Universities, a student may enroll in classes offered by the University of North Carolina at Chapel Hill and North Carolina State University in Raleigh. Although related work normally is taken in the natural sciences, computer sciences, or mathematics, a student with interests in the social or management sciences may take relevant work in these areas.

201. Advanced Mechanics of Solids. Tensor fields and index notation. Analysis of states of stress and strain. Conservation laws and field equations. Constitutive equations for elastic, viscoelastic, and elastic-plastic solids. Formulation and solution of simple problems in elasticity, viscoelasticity, and plasticity. 3 units. *Hueckel, Laursen, or Petroski*

203. Plasticity. Inelastic behavior of soils and engineering materials. Yield criteria. Flow rules. Concepts of perfect plasticity and plastic hardening. Methods of rigid-plasticity. Limit analysis. Isotropic and kinematic hardening. Plastic softening. Diffused damage. Thermo-plasticity. Visco-plasticity. Prerequisite: Civil Engineering 201 or consent of instructor. 3 units. *Hueckel*

204. Plates and Shells. Differential equation and extremum formulations of linear equilibrium problems of Kirchhoffian and non-Kirchhoffian plates of isotropic and orthotropic material. Solution methods. Differential equation formulation of thin shell problems in curvilinear coordinates; membrane and bending theories; specialization for shallow shells, shells of revolution, and plates. Extremum formulation of shell problems. Solution methods. Prerequisites: Engineering 75L or 135 and Mathematics 111. 3 units. *Utku*

205. Elasticity. Introduction to linear theory of elasticity. Constitutive equations for anisotropic and isotropic elastic solids. Formulation and solution of torsion, bending, and flexure problems. Plane, axisymmetric, and three-dimensional problems. 3 units. *Petroski*

207. Transport Phenomena in Biological Systems. See C-L: Biomedical Engineering 207; also C-L: Mechanical Engineering 207. 3 units. *Truskey*

209. Kinetics and Reactor Design. Prerequisite: Mathematics 111 or consent of instructor. See C-L: Biomedical Engineering 209. 3 units. *Staff*

210. Intermediate Dynamics. See C-L: Mechanical Engineering 210. 3 units. *Knight or Virgin*

215. Engineering Systems Analysis. Fundamental concepts and tools for engineering systems analysis, including optimization techniques and decision analysis. System definition and model formulation, optimization by calculus, linear programming, integer programming, separable integer programming, nonlinear programming, network analysis, dynamic programming, and decision analysis. Application to diverse engineering systems. 3 units. *Pas*

217. Transportation Systems Analysis. The transportation systems planning process. Quantitative analysis; mathematical modeling and computer simulation techniques for short-and long-range planning and evaluation of transportation systems. Prerequisite: (or corequisite) Civil Engineering 116 or consent of instructor. 3 units. *Pas*

218. Engineering Management and Project Evaluation. Statistical analysis and economics. Data organization, distributions, estimates of parameters, hypothesis testing, analysis of variance, experimental design. Economic impact assessment, supply and demand forecasting, benefit/cost analysis, economic incentives, public and private finance, input/output analysis. 3 units. *Peirce*

221. Engineering Systems Reliability, Safety, and Risk Assessment. Introduction to the concepts of design reliability and safety. Topics include: concepts of probability in engineering planning and design, decision analysis and assessment of reliability, modeling and analysis of uncertainty, reliability-based design, multiple failure mode analysis, redundant and nonredundant systems, and fault tree analysis. Emphasis on determining the probability of failure for numerous engineering systems including structural systems, infrastructure systems, water treatment systems, environmental systems, and transportation networks. Prerequisite: Mathematics 111 or consent of instructor. 3 units. *Jacobs*

225. Dynamic Engineering Hydrology. Dynamics of the occurrence, circulation, and distribution of water; climate, hydrometeorology, geophysical fluid motions. Precipitation, surface runoff and stream flow, infiltration, water losses. Hydrograph analysis, catchment characteristics, hydrologic instrumentation, and computer simulation models. Prerequisite: Civil Engineering 122L or consent of instructor. 3 units. *Medina*

227. Groundwater Hydrology and Contaminant Transport. Review of surface hydrology and its interaction with groundwater. The nature of porous media, hydraulic conductivity, and permeability. General hydrodynamic equations of flow in isotropic and anisotropic media. Water quality standards and contaminant transport processes: advective-dispersive equation for solute transport in saturated porous media. Analytical and numerical methods, selected computer applications. Deterministic versus stochastic models. Applications: leachate from sanitary landfills, industrial lagoons and ponds, subsurface wastewater injection, monitoring of groundwater contamination. Conjunctive surface-subsurface models. Prerequisite: Civil Engineering 123L or consent of instructor. 3 units. *Medina*

233. Prestressed Concrete Design. A critical review of research and recent developments in prestressed concrete design. Prestressed tanks, beams, and columns; partial prestressing and composite design. Prerequisite: Civil Engineering 133L. 3 units. *Biswas*

237. Advanced Soil Mechanics. Characterization of behavior of geomaterials. Stress-strain incremental laws. Nonlinear elasticity, hypo-elasticity, plasticity and viscoplasticity of geomaterials; approximated laws of soil mechanics; fluid-saturated soil behavior; cyclic behavior of soils; liquefaction and cyclic mobility; elements of soil dynamics; thermal effects on soils. Prerequisite: Civil Engineering 139L or equivalent. 3 units. *Hueckel*

240. Fate of Organic Chemicals in the Aquatic Environment. Kinetic, equilibrium, and analytical approaches applied to quantitative description of processes affecting the fate of anthropogenic and natural organic compounds in surface and groundwaters and in selected treatment processes, including sorption phenomena, gas transfer, hydrolysis, photochemistry, oxidation-reduction, and biodegradation. Sampling, detection, identification, and quantification of organic compounds in the environment. Gas and liquid chromatography and mass spectrometry. Prerequisites: university-level general chem-

istry and organic chemistry within last four years. C-L: Environment 240. 3 units. *Dubay and Faust*

241. Atmospheric Chemistry and Air Pollution. Chemical kinetics and equilibrium applied to the mechanistic and quantitative description of processes affecting the fates of anthropogenic and natural chemicals in the troposphere, on local, regional, and global scales. Direct photolysis; gas-phase photo-formation and fates of ozone, radicals, and other oxidants; gas-phase oxidations of volatile organic compounds; gas-to-drop partitioning; aqueous-phase photoformation and fates of hydrogen peroxide, radicals, and other oxidants in the aqueous phases of clouds, fogs, and aerosols; effects of aqueous-phase reactions on the chemical composition of the troposphere; gas-phase and aqueous-phase oxidations of organic and inorganic compounds; stratospheric ozone depletion. Prerequisites: university-level general chemistry and organic chemistry within last four years. C-L: Environment 241. 3 units. *Faust*

242. Environmental Aquatic Chemistry. Principles of chemical kinetics and equilibria applied to quantitative description of the chemistry of lakes, rivers, oceans, groundwaters, and selected treatment processes. Equilibrium, steady state, and other kinetic models applied to processes such as the carbonate system, coordination chemistry, precipitation and dissolution, oxidation-reduction, photochemistry, adsorption, and heterogeneous reactions. Prerequisite: university-level general chemistry within last four years. C-L: Environment 242. 3 units. *Faust*

243. Physicochemical Unit Operations in Water Treatment. Fundamental bases for design of water and waste treatment systems, including transport, mixing, sedimentation and filtration, gas transfer, coagulation, and absorption processes. Emphasis on physical and chemical treatment combinations for drinking water supply. Prerequisite: Civil Engineering 124L. 3 units. *Vesilind*

244. Applied Microbial Processes. Existing and novel microbial processes as they pertain to biotechnological products, specialty bioconversions, and to treat or exploit wastes. Concepts of microbiology, chemical engineering, the stoichiometry and kinetics of complex microbial metabolism, and process analysis. Specific processes such as carbon oxidation, vinegar and alcohol production, nitrification, methane production, biological electricity generation, recombinant protein secretion, and wastewater treatment in long-term space travel are discussed. Consent of instructor required. 3 units. *Staff*

245. Pollutant Transport Systems. Distribution of pollutants in natural waters and the atmosphere; diffusive and advective transport phenomena within the natural environment and through artificial conduits and storage/treatment systems. Analytical and numerical prediction methods. Prerequisites: Civil Engineering 122L and Mathematics 111 or equivalents. 3 units. *Medina*

246. Water Supply Engineering Design. The study of water resources and municipal water requirements including reservoirs, transmission, treatment and distribution systems; methods of collection, treatment, and disposal of municipal and industrial wastewaters. The course includes the preparation of a comprehensive engineering report encompassing all aspects of municipal water and wastewater systems. Field trips to be arranged. Prerequisite: Civil Engineering 124L or consent of instructor. 3 units. *Vesilind*

248. Solid Waste Engineering. Engineering design of material and energy recovery systems including traditional and advanced technologies. Sanitary landfills and incineration of solid wastes. Application of systems analysis to collection of municipal refuse. Major design project in solid waste management. Prerequisite: Civil Engineering 124L or consent of instructor. C-L: Environment 248. 3 units. *Vesilind*

249. Control of Hazardous and Toxic Waste. Engineering solutions to industrial and municipal hazardous waste management problems. Handling, transportation, storage, and disposal technologies. Biological, chemical, and physical processes. Upgrading an abandoned disposal site. Economic and regulatory aspects. Case studies. Consent of instructor required. 3 units. *Peirce*

251. Systematic Engineering Analysis. Mathematical formulation and numerical analysis of engineering systems with emphasis on theory of structures. Equilibrium and eigenvalue problems in distributed and discrete spaces; properties of these systems and discretization of systems in continuum by the trial functions with undetermined parameters. The use of weighted residual methods, finite elements, and finite differences. Prerequisite: senior or graduate standing. 3 units. *S. Utku*

252. Buckling of Engineering Structures. An introduction to the underlying concepts of elastic stability and buckling, development of classical (differential equation) and modern (energy) approaches, buckling of common engineering components including link models, struts, frames, plates, and shells. Consideration will also be given to inelastic behavior, postbuckling, and design implications. Prerequisite: Civil Engineering 131L or consent of instructor. C-L: Mechanical Engineering 252. 3 units. *Biswas or Virgin*

254. Introduction to the Finite Element Method. Investigation of the finite element method as a numerical technique for solving linear ordinary and partial differential equations, using rod and beam theory, heat conduction, elastostatics and dynamics, and advective/diffusive transport as sample systems. Emphasis placed on formulation and programming of finite element models, along with critical evaluation of results. Topics include: Galerkin and weighted residual approaches, virtual work principles, discretization, element design and evaluation, mixed formulations, and transient analysis. Prerequisites: a working knowledge of ordinary and partial differential equations, numerical methods, and programming in FORTRAN. 3 units. *Laurson*

257. Structural Optimization. Computer-aided improvement of structural designs; redesign search processes, sensitivity analysis, integrity analysis; optimization of static, steady-state, and transient response systems; minimization of structural weight and response potentials for trusses, frames, and continua. 3 units. *Staff*

265. Advanced Topics in Civil and Environmental Engineering. Opportunity for study of advanced subjects relating to programs within the civil and environmental engineering department tailored to fit the requirements of individuals or small groups. Variable credit. *Staff*

281. Experimental Systems. Formulation of experiments; Pi theorem and principles of similitude; data acquisition systems; static and dynamic measurement of displacement, force, and strain; interfacing experiments with digital computers for data storage, analysis, and plotting. Students select, design, perform, and interpret laboratory-scale experiments involving structures and basic material behavior. Prerequisite: senior or graduate standing in engineering or the physical sciences. 3 units. *J. F. Wilson*

283. Structural Dynamics. Formulation of dynamic models for discrete and continuous structures, normal mode analysis, deterministic and stochastic responses to shocks and environmental loading (earthquakes, winds, and waves), introduction to nonlinear dynamic systems, analysis and stability of structural components (beams and cables and large systems such as offshore towers, moored ships, and floating platforms). 3 units. *J. F. Wilson*

301, 302. Fall and Spring Seminars. Current topics in civil and environmental engineering theory and practice. Weekly seminar series. No credit. *Peirce*

399. **Special Readings in Civil and Environmental Engineering.** Special individual readings in a specific area of study in civil and environmental engineering. Approval of director of graduate studies required. 1 to 3 units. Variable credit. *Graduate faculty*

COURSES CURRENTLY UNSCHEDULED

- 202. **Advanced Mechanics of Solids II**
- 212. **Mechanical Behavior and Fracture of Materials**
- 216. **Transportation Planning and Policy Analysis**
- 222. **Open Channel Flow**
- 223. **Flow Through Porous Media**
- 226. **Operational Hydrology**
- 228L. **Sludge Management and Disposal**
- 231. **Structural Engineering Analysis**
- 232. **Reinforced Concrete Design**
- 234. **Advanced Structural Design in Metals**
- 235. **Foundation Engineering**
- 236. **Earth Structures**
- 238. **Rock Mechanics**
- 239. **Physical Properties of Soils**
- 247. **Air Pollution Control**
- 258. **Analysis of Dynamic and Nonlinear Behavior of Structures**
- 337. **Elements of Soil Dynamics**
- 350. **Advanced Engineering Analysis**

Electrical Engineering

Professor Casey, *Chair* (130 Engineering); Professor Nolte, *Director of Graduate Studies* (172 Engineering); Professors Fair, Gelenbe, Joines, Marinos, Trivedi, and Wang; Associate Professors Alexandrou, Kedem, Krolik, and Massoud; Assistant Professors Board, Daniels-Race, Dollas, George, Hansen, Teitsworth, and Overhauser; Professors Emeriti Owen and Wilson; Assistant Research Professor Ybarra; Adjunct Professors Glomb, Lontz, and Stroschio; Adjunct Associate Professor Kanopoulos; Adjunct Associate Professor Derby; Adjunct Assistant Professors Bottomley, Goodwin-Johansson, Loeb, Spano, and Strole; Visiting Professors Iafrate and McCumber

A student may specialize in any one of the following fields in working toward either the M.S. or the Ph.D. degree with a major in electrical engineering: computer engineering, computer architecture, fault-tolerant computer systems, scientific computing, parallel processing, VLSI CAD tools, signal processing, digital speech processing, signal detection and estimation, ocean acoustic signal processing, image processing, solid-state electronics, integrated circuit processing and process simulation, molecular-beam epitaxy, III-V compound semiconductor materials and devices, machine intelligence, application of electromagnetic fields and waves. Recommended prerequisites for the graduate courses in electrical engineering include a knowledge of basic mathematics and physics, electrical networks, and system theory. Students in doubt about their

background for enrollment in specific courses should discuss the matter with the director of graduate studies. The M.S. degree program includes either a thesis or a project and an oral examination. A qualifying examination is required for the Ph.D. degree program. This examination is intended to test both the breadth and depth of the student's understanding of basic electrical engineering concepts. There is no foreign language requirement.

211. Quantum Mechanics. Discussion of wave mechanics including elementary applications, free particle dynamics, Schrödinger equation including treatment of systems with exact solutions, and approximate methods for time-dependent quantum mechanical systems with emphasis on quantum phenomena underlying solid-state electronics and physics. Prerequisite: Mathematics 111 or equivalent. 3 units. *Staff*

214. Introduction to Solid-State Physics. Discussion of solid-state phenomena including crystalline structures, X-ray and particle diffraction in crystals, lattice dynamics, free electron theory of metals, energy bands, and superconductivity, with emphasis on understanding electrical and optical properties of solids. Prerequisite: quantum physics at the level of Physics 143L or Electrical Engineering 211. C-L: Physics 214. 3 units. *Teitsworth*

215. Semiconductor Physics. A quantitative treatment of the physical processes that underlie semiconductor device operation. Topics include band theory and conduction phenomena; equilibrium and nonequilibrium charge carrier distributions; charge generation, injection, and recombination; drift and diffusion processes. Prerequisite: Electrical Engineering 211 or consent of instructor. 3 units. *Daniels-Race*

216. Devices for Integrated Circuits. Derivation of basic semiconductor properties such as the effective mass, effective density of states, SHR recombination, avalanche breakdown and energy-band diagrams. Application of the continuity equation, Gauss' law, and Poisson's equation to obtain the I-V and C-V behavior of Si and GaAs Schottky barriers, GaAs MESFETs; Si JFETs, bipolar transistors and MOSFETs. Relation of device physics to SPICE parameters. Four laboratory exercises. 3 units. *Casey*

217. Analog Integrated Circuits. Analysis and design of analog integrated circuits. Bipolar and MOSFET circuits. SPICE models. Elementary integrated amplifier circuits, performance of operational amplifiers and other analog circuits including frequency response and noise. A/D converters and switched capacitor filters. Prerequisite: Electrical Engineering 216. 3 units. *Staff*

218. Integrated Circuit Engineering. Basic processing techniques and layout technology for integrated circuits. Photolithography, diffusion, oxidation, ion implantation, and metallization. Design, fabrication, and testing of integrated circuits. Prerequisite: Electrical Engineering 216. 3 units. *Fair*

219. Digital Integrated Circuits. Analysis and design of digital integrated circuits. IC technology. Switching characteristics and power consumption in MOS devices, bipolar devices, and interconnects. Analysis of digital circuits implemented in NMOS, CMOS, TTL, ECL, and BiCMOS. Propagation delay modeling. Analysis of logic (inverters, gates) and memory (SRAM, DRAM) circuits. Influence of technology and device structure on performance and reliability of digital ICs. SPICE modeling. Prerequisites: Electrical Engineering 151 and 216. 3 units. *Massoud*

243. Pattern Classification and Recognition. Parameter estimation and supervised learning, nonparametric techniques, linear discriminant functions, clustering, language theory related to pattern recognition, examples from areas such as character and severe weather recognition, classification of community health data, recognition of geometrical configurations, algorithms for recognizing low resolution touch-sensor array signatures and 3-D objects. Consent of instructor required. 3 units. *Wang*

245. Digital Control Systems. Review of traditional techniques used for the design of discrete-time control systems; introduction of "nonclassical" control problems of intelligent machines such as robots. Limitations of the assumptions required by traditional design and analysis tools used in automatic control. Consent of instructor required. 3 units. *Myers*

251. Advanced Digital System Design. Theory and hands-on experience in advanced digital system design. High-speed design, high complexity design (more than 10,000 gates), implementation technology selection, system modeling, power and clock distribution, line termination, and cooling. Case studies and demonstrations. Extensive use of CAD tools for logic minimization, logic synthesis, and system simulation. Rapid system prototyping with off-the-shelf and custom components. Laboratory exercises and a semester project. Prerequisites: Electrical Engineering 151 and 161. 3 units. *Dollas*

252. Advanced Digital Computer Architecture. A second course on computer architecture. Definition of high-performance computing. The von Neumann bottleneck, Amdahl's law. Computer taxonomies. Memory organization, Princeton/Harvard architectures, caches, and virtual memory. Instruction pipelining. Vector processing. Instruction sets (RISC/CISC/VLIW). Parallel processing (SIMD/MIMD). Multiprocessor interconnection networks, communications, and synchronization. Prerequisite: Computer Science 104 or Electrical Engineering 152. 3 units. *Board or Dollas*

253. Parallel System Performance. Intrinsic limitations to computer performance. Amdahl's Law and its extensions. Components of computer architecture and operating systems, and their impact on the performance available to applications. Intrinsic properties of application programs and their relation to performance. Task graph models of parallel programs. Estimation of best possible execution times. Task assignment and related heuristics. Load balancing. Specific examples from computationally intensive, I/O intensive, and mixed parallel and distributed computations. Global distributed system performance. Prerequisites: Computer Science 110; Electrical Engineering 151 and 152. 3 units. *Gelenbe*

254. Fault-Tolerant and Testable Computer Systems. Faults and failure mechanisms, test generation techniques and diagnostic program development for detection and location of faults in digital networks; design for testability, redundancy techniques, self-checking and fail-safe networks, fault-tolerant computer architectures. Prerequisite: Electrical Engineering 151 or equivalent. C-L: Computer Science 225. 3 units. *Marinos*

255. Mathematical Methods for Systems Analysis I. Basic concepts and techniques used in the stochastic modeling of systems. Elements of probability, statistics, queuing theory, and simulation. Prerequisite: four semesters of college mathematics. C-L: Computer Science 226. 3 units. *Trivedi*

257. Performance and Reliability of Computer Networks. Methods for performance and reliability analysis of local area networks as well as wide area networks. Probabilistic analysis using Markov models, stochastic Petri nets, queuing networks, and hierarchical models. Statistical analysis of measured data and optimization of network structures. Prerequisites: Electrical Engineering 156 and 255. 3 units. *Trivedi*

258. Artificial Neural Networks. Elementary biophysical background for signal propagation in natural neural systems. Artificial neural networks (ANN) and the history of computing; early work of McCulloch and Pitts, of Kleene, of von Neumann and others. The McCulloch and Pitts model. The connectionist model. The random neural network model. ANN as universal computing machines. Associative memory; learning; algorithmic aspects of learning. Complexity limitations. Applications to pattern recog-

dition, image processing and combinatorial optimization. Prerequisite: Electrical Engineering 151. 3 units. *Gelenbe*

261. Full Custom VLSI Design. A first course in VLSI design with CMOS technologies. A study of devices, circuits, fabrication technology, logic design techniques, subsystem design and system architecture. Modeling of circuits and subsystems. Testing of gates, subsystems and chips, and design for testability. The fundamentals of full-custom design, and some semi-custom design. Prerequisite: Electrical Engineering 151 or equivalent; Electrical Engineering 163L or equivalent. 3 units. *Dollas or Overhauser*

262. Advanced VLSI Design and Test. An advanced course in VLSI design with emphasis on the design of application specific IC's (ASIC) for a given set of specifications. Discussions of available technologies for ASIC implementation and tradeoffs in using these technologies. Static and dynamic CMOS design of commonly used circuits (adders, multipliers, RAM, pads). Packaging and testing of ASIC's with emphasis on functional and performance verification. This course stresses the design of ASIC's within a systems design environment and with the use of appropriate design tools that can be used to validate a design based on a given set of design specifications. Prerequisite: Electrical Engineering 261. 3 units. *Dollas or Kanopoulos*

266. VLSI Design Verification Techniques. VLSI verification tool design. Design and capabilities of circuit simulation, timing simulation, logic simulation, and functional simulation. Techniques applied in timing verification and other static verification tools. Parallel processing and its application to simulation. Physical design issues related to verification. Prerequisite: Electrical Engineering 261, working knowledge of C. 3 units. *Overhauser*

269. VLSI Chip Testing. Introduction to VLSI chip and system testing. Testing theory, strategies, and fault identification. Hands-on testing experience with faulty chips and systems, chips designed in Electrical Engineering 261, and testing equipment available in the department. Prerequisite: Electrical Engineering 261. 3 units. *Overhauser*

271. Electromagnetic Theory. The classical theory of Maxwell's equations; electrostatics, magnetostatics, boundary value problems including numerical solutions, currents and their interactions, and force and energy relations. Three class sessions. Consent of instructor required. 3 units. *Joines*

272. Electromagnetic Communication Systems. Review of fundamental laws of Maxwell, Gauss, Ampere, and Faraday. Elements of waveguide propagation and antenna radiation. Analysis of antenna arrays by images. Determination of gain, loss, and noise temperature parameters for terrestrial and satellite electromagnetic communication systems. Prerequisite: Electrical Engineering 170 or 271. 3 units. *Joines*

273. Optical Communication Systems. Mathematical methods, physical ideas, and device concepts of optoelectronics. Maxwell's equations, and definitions of energy density and power flow. Transmission and reflection of plane waves at interfaces. Optical resonators, waveguides, fibers, and detectors are also presented. Prerequisite: Electrical Engineering 170 or equivalent. 3 units. *Joines*

274. Modern Optics. Optical processes including the propagation of light, coherence, interference, and diffraction. Consideration of the optical properties of solids with applications of these concepts to lasers and modern optical devices. C-L: Physics 185. 3 units. *Guenther*

275. Microwave Electronic Circuits. Microwave circuit analysis and design techniques. Properties of planar transmission lines for integrated circuits. Matrix and computer-aided methods for analysis and design of circuit components. Analysis and design of input, output, and interstage networks for microwave transistor amplifiers

and oscillators. Topics on stability, noise, and signal distortion. Prerequisite: Electrical Engineering 170 or equivalent. 3 units. *Joines*

281. Random Signals and Noise. Introduction to mathematical methods of describing and analyzing random signals and noise. Review of probability theory; joint, conditional, and marginal distributions; random processes. Time and ensemble averages, correlation, and power spectra. Optimum linear smoothing and predicting filters. Introduction to optimum signal detection, parameter estimation, and statistical signal processing. Prerequisite: Mathematics 135 or Statistics 113. 3 units. *Hansen*

282. Digital Signal Processing. Introduction to the fundamentals of processing signals by digital techniques with applications to practical problems. Discrete time signals and systems, elements of the Z-transform, discrete Fourier transforms, digital filter design techniques, fast Fourier transforms, and discrete random signals. 3 units. *Nolte*

283. Digital Communication Systems. Digital modulation techniques. Coding theory. Transmission over bandwidth constrained channels. Signal fading and multipath effects. Spread spectrum. Optical transmission techniques. Prerequisite: Electrical Engineering 281 or consent of instructor. 3 units. *Bottomley*

285. Signal Detection and Extraction Theory. Introduction to signal detection and information extraction theory from a statistical decision theory viewpoint. Subject areas covered within the context of a digital environment are decision theory, detection and estimation of known and random signals in noise, estimation of parameters and adaptive recursive digital filtering, and decision processes with finite memory. Applications to problems in communication theory. Prerequisite: Electrical Engineering 281 or consent of instructor. 3 units. *Nolte*

286. Digital Processing of Speech Signals. Detailed treatment of the theory and application of digital speech processing. Modeling of the speech production system and speech signals; speech processing methods; digital techniques applied in speech transmission, speech synthesis, speech recognition, and speaker verification. Acoustic-phonetics, digital speech modeling techniques, LPC analysis methods, speech coding techniques. Application case studies: synthesis, vocoders, DTW (dynamic time warping)/HMM (hidden Markov modeling) recognition methods, speaker verification/identification. Prerequisite: Electrical Engineering 182 or equivalent or consent of instructor. 3 units. *Hansen*

287. Underwater Communications. Elements of communication theory and digital signal processing are combined with basic physics and oceanography to offer an overview of underwater communications, with an emphasis on the radar/sonar problem. Beamforming with transducer arrays. Signal design and target resolution; the ambiguity function. The ocean as a communication channel: sound propagation and ambient noise characteristics. Performance analysis of selected communication scenarios and case studies of operational sonar systems. Prerequisite: Electrical Engineering 181 or consent of instructor. 3 units. *Alexandrou*

288. Image and Array Signal Processing. Multidimensional digital signal processing with applications to practical problems in image and sensor array processing. Two-dimensional discrete signals and systems, discrete random fields, 2-D sampling theory, 2-D transforms, image enhancement, image filtering and restoration, space-time signals, beamforming, and inverse problems. Prerequisite: Electrical Engineering 282 or consent of instructor. 3 units. *Krolik*

289. Adaptive Filters. Adaptive digital signal processing with emphasis on the theory and design of finite-impulse response adaptive filters. Stationary discrete-time stochastic processes, Wiener filter theory, the method of steepest descent, adaptive

transverse filters using gradient-vector estimation, analysis of the LMS algorithm, least-squares methods, recursive least squares and least squares lattice adaptive filters. Application examples in noise canceling, channel equalization, and array processing. Prerequisites: Electrical Engineering 281 and Electrical Engineering 282 or consent of instructor. 3 units. *Krolik*

299. Advanced Topics in Electrical Engineering. Opportunity for study of advanced subjects related to programs within the electrical engineering department tailored to fit the requirements of a small group. Consent of Director of Undergraduate Studies and of supervising instructor required. Variable credit. *Staff*

312. Electronic Properties of Submicron Solid-State Devices. Review of quantum mechanics, scattering and transport, Boltzmann transport equation, quantum effects in devices with emphasis on one- and two-dimensional transport, electron-polar phonon interactions, quantum transport. Prerequisite: quantum mechanics. C-L: Physics 333. 3 units. *Stroschio*

316. Advanced Physics of Semiconductor Devices. Semiconductor materials: band structure and carrier statistics. Advanced treatments of metal-semiconductor contacts, Schottky barriers, p-n junctions, bipolar transistors (charge-control and Gummel-Poon models), and field-effect transistors (short channel effects, scaling theory, subthreshold conduction, nonuniformly doped substrates, surface and buried-channel devices, hot-electron effects). Device modeling in two dimensions using PISCES. Prerequisite: Electrical Engineering 216. 3 units. *Goodwin-Johansson and Massoud*

318. Integrated Circuit Fabrication Laboratory. Introduction to IC fabrication processes. Device layout. Mask design and technology. Wafer cleaning, etching, thermal oxidation, thermal diffusion, lithography, and metallization. Laboratory fabrication and characterization of basic IC elements (p-n junctions, resistors, MOS capacitors, gated diodes, and MOSFETs). Use of four-point probe, ellipsometer, spreading resistance probe, scanning electron microscope, and evaporation system. Testing of basic inverters and gates. Prerequisites: Electrical Engineering 218 and consent of instructor. 3 units. *Massoud*

352. Advanced Topics in Digital Systems. A selection of advanced topics from the areas of digital computer architectures and fault-tolerant computer design. Prerequisite: Electrical Engineering 252 or equivalent. C-L: Computer Science 320. 3 units. *Staff*

361. Advanced VLSI Design. Theory of advanced VLSI design. Specifications development, methodology, issues, circuit-level trade-offs. Full custom design, standard cell design, gate array design, silicon compilation. Semiconductor technologies and logic families for semi-custom design. Clocking schemes and distribution, race conditions. Design of a variety of circuits (adders, I/O drivers, RAM, FIFO, etc.) Testing of all phases in the life cycle of an integrated circuit. Top-down design and bottom-up implementation. Student projects. Prerequisite: Electrical Engineering 261 or equivalent. C-L: Computer Science 322. 3 units. *Dollas or Kedem*

399. Special Readings in Electrical Engineering. Special individual readings in a specified area of study in electrical engineering. Approval of director of graduate studies required. 1 to 4 units. Variable credit. *Graduate staff*

COURSES CURRENTLY UNSCHEDULED

311. Quantum Electronics

334. Nonlinear Oscillations in Physical Systems

342. Optimal Control Theory

371. Advanced Electromagnetic Theory

373. Selected Topics in Field Theory

382. Advanced Topics in Signal Processing

383. Applied Information Theory and Statistical Estimation

Mechanical Engineering and Materials Science

Professor Hochmuth, *Chair* (142A Engineering); Professor Harman, *Director of Graduate Studies* (145 Engineering); Professors Behringer, Bejan, Cocks, Dowell, Garg, Gösele, Pearsall, Shaughnessy, Shepard, and Tan; Associate Professors Bliss, Jones, Knight, Needham, and Wright; Assistant Professors Buzzard, Chen, Clark, Hall, Howle, Lozier, Thompson, and Virgin; Research Assistant Professors Nagchaudhuri and Ping-Beall; Adjunct Professor Lee; Adjunct Associate Professors Cherry, Crowson, Jenkins, Tran-Son-Tay, and Wu

The department offers programs of study and research leading to the M.S. and Ph.D. degrees in both mechanical engineering and materials science. Within mechanical engineering, the broad areas of concentration include thermal and fluids systems, mechanics and biomechanics, and dynamics, including nonlinear dynamics and control. Within materials science, the areas of concentration include electronic materials, biomaterials, failure analysis, and the determination of material characteristics. The department emphasizes a highly research-oriented Ph.D. degree program. Current research areas available include: cell, membrane, and surface engineering; biorheology; convection; granular flow; diffusion and heat transfer in heterogeneous media; thermal phenomena in micro- and nanostructures; aeroelasticity; computational fluid dynamics; chaotic systems; vibrations and acoustics of dynamic systems; sound propagation and absorbing materials; unsteady aerodynamics; thermal design by entropy generation minimization; control systems; robotics; expert systems; bearing design and lubrication; nano-tribology; magnetic levitation; mechanical properties of human stones; positron annihilation spectroscopy; diffusion and kinetics in Si, GaAs, and other electronic materials; semiconductor wafer bonding; computational materials science; and structural and offshore mechanics.

202. Engineering Thermodynamics. Axiomatic formulations of the first and second laws. General thermodynamic relationships and properties of real substances. Energy, availability, and second law analysis of energy conversion processes. Reaction and multiphase equilibrium. Power generation. Low temperature refrigeration and the third law of thermodynamics. Thermodynamic design. 3 units. *Bejan*

207. Transport Phenomena in Biological Systems. See C-L: Biomedical Engineering 207; also C-L: Civil Engineering 207. 3 units. *Truskey*

208. Introduction to Colloid and Surface Science. This course divides naturally into three sections. The colloid state: classification of colloids and the theoretical frameworks and experimental techniques involved in their characterization. Interfaces: surface tension and free energy; curved interfaces; adhesion, cohesion and wetting; surface activity; catalytic and mechanical properties of solid surfaces. Inter-Surface Forces: the balance of attractive and repulsive forces which operate between colloidal particles and at macroscopic surfaces. Some emphasis on natural and artificial biomembranes. Consent of instructor required. 3 units. *Needham*

210. Intermediate Dynamics. Comprehensive treatment of space kinematics, kinetics of particles and rigid bodies, generalized coordinates, and Lagrange's equations. Introduction to nonlinear and random dynamic analysis of flexible, continuous systems and stability. C-L: Civil Engineering 210. 3 units. *Knight or Virgin*

211. Theoretical and Applied Polymer Science. An advanced course in materials science and engineering dealing specifically with the structure and properties of polymers. Particular attention paid to recent developments in the processing and use of modern plastics and fibers. Product design considered in terms of polymer structures, processing techniques, and properties. C-L: Biomedical Engineering 208. 3 units. *H. Clark*

212. Electronic Materials. An advanced course in materials science and engineering dealing with the various materials important for solid-state electronics including semiconductors, ceramics, and polymers. Emphasis on thermodynamic concepts and on defects in these materials. Materials preparation and modification methods for technological applications. Prerequisite: Engineering 83L. 3 units. *Tan*

214. Corrosion and Corrosion Control. Environmental aspects of the design and utilization of modern engineering alloys. Theory and mechanisms of corrosion, particularly in seawater and atmospheric environments. Microstructural aspects of diffusion, oxidation, hot corrosion, and stress corrosion. Prerequisite: Engineering 83L. 3 units. *Jones*

215. Biomedical Materials and Artificial Organs. Prerequisite: Biomedical Engineering 83L, Engineering 83L or Chemistry 151L or consent of instructor. See C-L: Biomedical Engineering 215. 3 units. *H. Clark or Reichert*

216. Mechanical Metallurgy. An advanced materials science course dealing with the response of materials to applied forces. Mechanical fundamentals; stress-strain relationships for elastic behavior; theory of plasticity. Metallurgical fundamentals; plastic deformation, dislocation theory; strengthening mechanisms. Mechanical behavior of polymers. Applications to materials testing. Prerequisites: Engineering 75L and Engineering 083L. 3 units. *Jones*

217. Fracture of Engineering Materials. Conventional design concepts and their relationship to the occurrence of fracture. Linear elastic and general yield fracture mechanics. Microscopic plastic deformation and crack propagation. The relationship between macroscopic and microscopic aspects of fracture. Time dependent fracture. Fracture of specific materials. Prerequisites: Engineering 83L and Mechanical Engineering 115L. 3 units. *Jones*

218. Thermodynamics of Electronic Materials. Basic thermodynamic concepts applied to solid state materials with emphasis on technologically relevant electronic materials such as silicon and GaAs. Thermodynamic functions, phase diagrams, solubilities and thermal equilibrium concentrations of point defects; nonequilibrium processes and the kinetic phenomena of diffusion, precipitation, and growth. 3 units. *Tan*

221. Compressible Fluid Flow. Basic concepts of the flow of gases from the subsonic to the hypersonic regime. One-dimensional wave motion, the acoustic equations, and waves of finite amplitude. Effects of area change, friction, heat transfer, and shock on one-dimensional flow. Moving and oblique shock waves and Prandtl-Meyer expansion. 3 units. *Shaughnessy*

225. Mechanics of Viscous Fluids. Equations of motion for a viscous fluid, general properties and selected solutions of the Navier-Stokes equations, the Stokes equations, laminar boundary layer equations with selected solutions and approximation techniques, origin of turbulence. 3 units. *Hochmuth*

226. Intermediate Fluid Mechanics. A survey of the principal concepts and equations of fluid mechanics, fluid statics, surface tension, the Eulerian and Lagrangian description, kinematics, Reynolds transport theorem, the differential and integral equa-

tions of motion, constitutive equations for a Newtonian fluid, the Navier-Stokes equations, and boundary conditions on velocity and stress at material interfaces. 3 units. *Shaughnessy or Thompson*

227. Advanced Fluid Mechanics. Flow of a uniform incompressible viscous fluid. Exact solutions to the Navier-Stokes equation. Similarity methods. Irrotational flow theory and its applications. Elements of boundary layer theory. Prerequisite: Mechanical Engineering 226 or consent of instructor. 3 units. *Shaughnessy*

228. Lubrication. Derivation and application of the basic governing equations for lubrication; the Reynolds equation and energy equation for thin films. Analytical and computational solutions to the governing equations. Analysis and design of hydrostatic and hydrodynamic slider bearings and journal bearings. Introduction to the effects of fluid inertia and compressibility. Dynamic characteristics of a fluid film and effects of bearing design on dynamics of machinery. Prerequisites: Mathematics 111 and Mechanical Engineering 126L. 3 units. *Knight*

229. Computational Fluid Mechanics and Heat Transfer. An exposition of numerical techniques commonly used for the solution of partial differential equations encountered in engineering physics. Finite-difference schemes (which are well-suited for fluid mechanics problems); notions of accuracy, conservation, consistency, stability, and convergence. Recent applications of weighted residuals methods (Galerkin), finite-element methods, and grid generation techniques. Through specific examples, the student is guided to construct and assess the performance of the numerical scheme selected for the particular type of transport equation (parabolic, elliptic, or hyperbolic). 3 units. *Howle*

230. Modern Control and Dynamic Systems. Dynamic modeling of complex linear and nonlinear physical systems involving the storage and transfer of matter and energy. Unified treatment of active and passive mechanical, electrical, and fluid systems. State-space formulation of physical systems. Time and frequency-domain representation. Controllability and observability concepts. System response using analytical and computational techniques. Lyapunov method for system stability. Modification of system characteristics using feedback control and compensation. Emphasis on application of techniques to physical systems. 3 units. *Garg or Nagchaudhuri*

235. Advanced Mechanical Vibrations. Analytical and experimental procedures applied to the design of machines and systems for adequate vibration control. Determination of eigenvalues and eigenvectors by iteration and computer techniques, transfer matrices applied to lumped and distributed systems, analytical and numerical methods of obtaining the pulse response of plane and three-dimensional multimass systems, convolution and data processing, introduction to random vibration. 3 units. *Knight or Wright*

236. Engineering Acoustics. Fundamentals of acoustics including sound generation, propagation, reflection, absorption, and scattering. Emphasis on basic principles and analytical methods in the description of wave motion and the characterization of sound fields. Applications including topics from noise control, sound reproduction, architectural acoustics, and aerodynamic noise. Occasional classroom or laboratory demonstration. Prerequisites: Engineering 123L and Mathematics 111 or consent of instructor. 3 units. *Bliss*

237. Aerodynamics. Fundamentals of aerodynamics applied to wings and bodies in subsonic and supersonic flow. Basic principles of fluid mechanics and analytical methods for aerodynamic analysis. Two- and three-dimensional wing theory, slender-body theory, lifting surface methods, vortex and wave drag. Brief introduction to vehicle

design, performance, and dynamics. Special topics such as unsteady aerodynamics, vortex wake behavior, and propeller and rotor aerodynamics. 3 units. *Bliss*

238. Advanced Aerodynamics. Advanced topics in aerodynamics. Conformal transformation techniques. Three-dimensional wing theory, optimal span loading for planar and nonplanar wings. Ground effect and tunnel corrections. Propeller theory. Slender wing theory and slender body theory, transonic and supersonic area rules for minimization of wave drag. Numerical methods in aerodynamics including source panel and vortex lattice methods. Prerequisite: Mechanical Engineering 237. 3 units. *Hall*

239. Unsteady Aerodynamics. Analytical and numerical methods for computing the unsteady aerodynamic behavior of airfoils and wings. Small disturbance approximation to the full potential equation. Unsteady vortex dynamics. Kelvin impulse and apparent mass concepts applied to unsteady flows. Two-dimensional unsteady thin airfoil theory. Time domain and frequency domain analyses of unsteady flows. Three-dimensional unsteady wing theory. Introduction to unsteady aerodynamic behavior of turbomachinery. Prerequisite: Mechanical Engineering 237. 3 units. *Hall*

240. Patent Technology and Law. The use of patents as a technological data base is emphasized including information retrieval in selected engineering disciplines. Fundamentals of patent law and patent office procedures. Consent of instructor required. 3 units. *Cocks*

245. Applications in Expert Systems. A comprehensive introduction to the key practical principles, techniques, and tools being used to implement knowledge-based systems. The classic MYCIN system studied in detail to provide historic perspective. Current systems employing combinations of production rules, prototypical knowledge, and frame-based case studies. Student term projects consist of the development of individual, unique expert systems using the Texas Instruments Personal Consultant. Knowledge of LISP not a prerequisite. 3 units. *Wright*

252. Buckling of Engineering Structures. Prerequisite: Civil Engineering 131L or consent of instructor. See C-L: Civil Engineering 252. 3 units. *Biswas or Virgin*

265. Advanced Topics in Mechanical Engineering. Opportunity for study of advanced subjects related to programs within mechanical engineering tailored to fit the requirements of a small group. Approval of Director of Undergraduate or Graduate Studies required. Variable credit. *Staff*

268. Cellular and Biosurface Engineering. A combination of fundamental concepts in materials science, colloids, and interfaces that form a basis for characterizing: the physical properties of biopolymers, microparticles, artificial membranes, biological membranes, and cells; and the interactions of these materials at biofluid interfaces. Definition of the subject as a coherent discipline and application of its fundamental concepts to biology, medicine, and biotechnology. Prerequisite: Mechanical Engineering 208 or consent of instructor. 3 units. *Needham*

270. Robot Control and Automation. Review of kinematics and dynamics of robotic devices; mechanical considerations in design of automated systems and processes, hydraulic and pneumatic control of components and circuits; stability analysis of robots involving nonlinearities; robotic sensors and interfacing; flexible manufacturing; man-machine interaction and safety consideration. Prerequisites: Mechanical Engineering 230 or equivalent and consent of instructor. 3 units. *Garg*

277. Optimization Methods for Mechanical Design. Definition of optimal design. Methodology of constructing quantitative mathematical models. Nonlinear programming methods for finding "best" combination of design variables: minimizing steps,

gradient methods, flexible tolerance techniques for unconstrained and constrained problems. Emphasis on computer applications and term projects. Consent of instructor required. 3 units. *Wright*

280. Convective Heat Transfer. Models and equations for fluid motion, the general energy equation, and transport properties. Exact, approximate, and boundary layer solutions for laminar flow heat transfer problems. Use of the principle of similarity and analogy in the solution of turbulent flow heat transfer. Two-phase flow, nucleation, boiling, and condensation heat and mass transfer. 3 units. *Bejan*

281. Conduction and Radiation. Conduction heat transfer in the steady and transient state, in rectangular, cylindrical, and spherical coordinates. Melting and solidification. Radiation exchange involving absorbing and emitting media including gases and flames, combined conduction and radiation, and combined convection and radiation. Exact and approximate methods of solution including separation of variables, transform calculus, numerical procedures, and integral and variational methods. 3 units. *Bejan*

290. Physical Oceanography. Introduction to the dynamic principles of ocean circulation with an emphasis on large temporal and spatial scales of motion. Topics include wind-driven and density-driven flow, western boundary intensification, mid-ocean, shelf, and tropical circulations. Corequisite: Geology 250. Prerequisites: Mathematics 31 and 32 or consent of instructor. C-L: Environment 290, Geology 203, and Marine Sciences. 3 units. *Lozier*

325. Aeroelasticity. A study of the statics and dynamics of fluid/structural interaction. Topics covered include static aeroelasticity (divergence, control surface reversal), dynamic aeroelasticity (flutter, gust response), unsteady aerodynamics (subsonic, supersonic, and transonic flow), and a review of the recent literature including nonlinear effects such as chaotic oscillations. Prerequisites: Mathematics 230 and consent of instructor. 3 units. *Dowell*

331. Nonlinear Control Systems. Analytical, computational, and graphical techniques for solution of nonlinear systems; Krylov and Bogoliubov asymptotic method; describing function techniques for analysis and design; Liapounov functions and Lure's methods for stability analysis; Aizerman and Kalman conjectures; Popov, circle, and other frequency-domain stability criteria for analysis and synthesis. Prerequisite: Mechanical Engineering 230 or consent of instructor. 3 units. *Garg or Wright*

335. Nonlinear Mechanical Vibration. A comprehensive treatment of the role of nonlinearities in engineering dynamics and vibration. Analytical, numerical, and experimental techniques are developed within a geometrical framework. Prerequisite: Mechanical Engineering 210 or 235 or equivalent. 3 units. *Virgin*

399. Special Readings in Mechanical Engineering. Individual readings in advanced study and research areas of mechanical engineering. Approval of director of graduate studies required. 1 to 3 units. Variable credit. *Staff*

COURSES CURRENTLY UNSCHEDULED

224. An Introduction to Turbulence

322. Mechanics of Viscous Fluids

English

Professor Jackson, *Chair* (312 Allen); Professor Tetel, *Director of Graduate Studies* (316 Allen); Professors Applewhite, Butters, Clum, C. Davidson, DeNeef, Fish, Gleckner, Holloway, F. Lentricchia, Price, Randall, Ryals, Sedgwick, B. H. Smith, Strandberg, Tompkins, Torgovnick, and Williams; Professor of the Practice Gopen; Associate Profes-

sors Gaines, Gerber, Jones, Mellow, Moon, Pope, Porter, Schwartz, and Willis; Assistant Professors Chandler, Ferraro, Moses, Pfau, Tetel, and Thorn; Assistant Professors of the Practice Cox, Hilliard, and M. Lentricchia; Adjunct Professor A. E. Davidson

The department offers graduate work leading to the A.M. and Ph.D. degrees, although normally only students seeking the doctorate are admitted to the department. The A.M. degree, if not already earned elsewhere, may be taken by students en route to the Ph.D. (although it is not required) and by those who elect to leave the doctoral program. A statement of the requirements for the A.M. and Ph.D. degrees may be obtained from the director of graduate studies. The department requires a reading knowledge of at least one foreign language for the Ph.D. degree, the specific language (or languages) to be determined by the student's major areas of academic concentration.

Applicants to the program in English should also furnish a copy (not returnable) of a term paper or other essay in nonfiction prose submitted in fulfillment of a requirement in an academic course.

For Seniors and Graduates

202S. Narrative Writing. The writing of short stories, memoirs, tales, and other narrations. Readings from ancient and modern narrative. Close discussion of frequent submissions by class members. Consent of instructor required. 3 units. *Price*

203S. Advanced Narrative Writing. The writing of extended narrative prose—long stories, novellas, substantive memoirs. Students should be proficient in the writing of short narratives. Consent of instructor required. 3 units. *Price*

205. Semiotics and Linguistics. See C-L: Russian 205. 3 units. *Andrews (Slavic)*

207A. Introduction to Old English. An introduction to the language of the Anglo-Saxon period (700-1100), with readings in representative prose and poetry. Not open to students who have taken 113A or the equivalent. C-L: Medieval and Renaissance Studies. 3 units. *Staff*

207B. Old English Literature. Critical study of Anglo-Saxon prose and poetry, with attention to the historical and cultural context. Not open to students who have taken 113B. Prerequisite: English 113A, 207A or the equivalent. C-L: Medieval and Renaissance Studies. 3 units. *Staff*

208. History of the English Language. Introductory survey of the changes in sounds, forms, and vocabulary of the English language from its beginning to the present, with emphasis on the evolution of the language as a medium of literary expression. Not open to students who have taken English 112. C-L: Medieval and Renaissance Studies. 3 units. *Butters or Tetel*

212. Middle English Literature: 1100 to 1500. Selected topics. C-L: Medieval and Renaissance Studies. 3 units. *Staff*

213, 214. Chaucer. 213: first two-thirds of his career, especially *Troilus and Criseyde*. 214: *The Canterbury Tales*. C-L: Medieval and Renaissance Studies. 3 units each. *Staff*

221. Renaissance Prose and Poetry: 1500 to 1660. Selected topics. C-L: Medieval and Renaissance Studies. 3 units. *DeNeef, Fish, Randall, or Schwartz*

222. Reading Milton. Milton's epic as a way of exploring some of the questions that have recently been asked about the humanities in general and literary studies in particular. Is the reconstruction of a perspective within which older texts can be responsibly read possible? What do you have to "know" in order to read *Paradise Lost*? What do you have to know in order to know what you have to know to read *Paradise*

Lost? Obviously, *Paradise Lost* will be the center of the course, but we shall also read others of Milton's works and look into the tight little world of Milton criticism. 3 units. *Fish*

225. Renaissance Drama: 1500 to 1642. Selected topics. C-L: Medieval and Renaissance Studies. 3 units. *Randall*

235. Restoration and Eighteenth-Century Literature: 1660 to 1800. Selected topics. 3 units. *Jackson or Thorn*

241. Romantic Literature: 1790 to 1830. Selected topics. 3 units. *Applewhite, Gleckner, Jackson, or Pfau*

245. Victorian Literature: 1830 to 1900. Selected topics. 3 units. *Ryals or Sedgwick*

251. British Literature since 1900. Selected topics. 3 units. *F. Lentricchia, Mellow, Moses, or Torgovnick*

263. American Literature to 1865. Selected topics. 3 units. *C. Davidson, Jones, Moon, or Tompkins*

267. American Literature: 1865 to 1915. Selected topics. 3 units. *C. Davidson, Tompkins, or K. Williams*

269. American Women Writers. Selected topics. C-L: Women's Studies. 3 units. *C. Davidson, Pope, or Tompkins*

275. American Literature since 1915. Selected topics. 3 units. *Ferraro, F. Lentricchia, Pope, or Strandberg*

281. Studies in Genre. History, criticism, and theory of literary genres such as the novel, pastoral, epic, and drama. 3 units. *Staff*

284. Contemporary Film Theory. Post-1968 film theory—Brechtian aesthetics, cinema semiotics, psychoanalytic film theory, technology, feminist theory, and Third World cinema. 3 units. *Gaines*

285. Major Texts in the History of Literary Criticism. A survey of major critical writings from Aristotle to the present. 3 units. *Staff*

288. Special Topics. Subjects, areas, or themes that cut across historical eras, several national literatures, or genres. 3 units. *Staff*

289. The Theory of the Novel. Major issues in the history and theory of the novel. 3 units. *Moses or Torgovnick*

290. Methods of Composition Pedagogy. A philosophical and practical exploration of developments in the field of composition studies. Cognition, concept formation, psycholinguistics, interpretation, and the making of meaning. Works by Burke, Richards, Kitzhaber, Berlin, Berthoff, Bizzell, Elbow, Corbett, Macrorie, Williams, Coles, and others. 3 units. *Gopen and Hillard*

For Graduates

310. Studies in Old English Literature. Intensive study of major Old English texts. C-L: Medieval and Renaissance Studies. 3 units. *Staff*

312. Studies in Middle English Literature. C-L: Medieval and Renaissance Studies. 3 units. *Staff*

315. Studies in Chaucer. C-L: Medieval and Renaissance Studies. 3 units. *Staff*

- 321. Studies in Renaissance Literature.** C-L: Medieval and Renaissance Studies and Women's Studies. 3 units. *DeNeef, Fish, Porter, Randall, or Schwartz*
- 324. Studies in Shakespeare.** C-L: Medieval and Renaissance Studies. 3 units. *Porter*
- 329. Studies in Milton.** C-L: Medieval and Renaissance Studies. 3 units. *DeNeef, Fish, or Schwartz*
- 337. Studies in Augustanism.** 3 units. *Jackson*
- 338. Studies in a Major Augustan Author.** 3 units. *Jackson*
- 341. Studies in Romanticism.** 3 units. *Applewhite, Gleckner, Jackson, or Pfau*
- 347. Studies in Victorianism.** 3 units. *Ryals or Sedgwick*
- 348. Studies in a Major Nineteenth-Century British Author.** 3 units. *Gleckner, Jackson, Pfau, Ryals, or Sedgwick*
- 353. Studies in Modern British Literature.** 3 units. *Mellown, Moses, or Torgoornick*
- 361. Studies in American Literature before 1915.** 3 units. *Jones, Moon, Tompkins, or K. Williams*
- 368. Studies in a Major American Author before 1915.** 3 units. *C. Davidson, Jones, Moon, Tompkins, or K. Williams*
- 375. Studies in Modern American Literature.** 3 units. *Applewhite, Ferraro, Lentricchia, or Strandberg*
- 376. Studies in a Modern Author (British or American).** 3 units. *Applewhite, Lentricchia, Mellown, Moses, Pope, Strandberg, or Torgoornick*
- 381. Special Topics Seminar.** 3 units. *Staff*
- 385. Studies in Literary Criticism.** 3 units. *Fish, Lentricchia, Moses, Pfau, Pope, Sedgwick, B. H. Smith, or Tompkins*
- 386. Problems in the Theory of Value and Judgment.** See C-L: Literature 300; also C-L: Philosophy 300. 3 units. *B. H. Smith*
- 388. The History of Rhetoric: Classical to Renaissance.** The foundations of rhetorical studies from Plato, Aristotle, Cicero, and Quintilian through Longinus, Augustine, and Erasmus to Bacon and Ramus. No prerequisites. 3 units. *Gopen*
- 389. The History of Rhetoric: Eighteenth to Twentieth Centuries.** Continuing study of the major texts in the history of rhetoric with special attention paid to J. Q. Adams, Campbell, Blair, Whately, Bain, Perelman, and Burke. Prerequisite: English 388. 3 units. *Gopen*
- 390. Composition Theory and Pedagogy.** Methodologies of teaching composition, with special emphasis on the theories of structural stylistics employed in the University Writing Program (UWP). All students registering in the course must hold a tutorship in the UWP, must attend the UWP training seminar and all scheduled UWP staff meetings, and will be observed teaching by a UWP director. Ungraded. 3 units. *Gopen*
- 391. Tutorial in Special Topics.** Directed research and writing in areas unrepresented by regular course offerings. Consent of instructor required. 3 units. *Staff*
- 392. Tutorial in Journal Editing.** Systematic exposure to all phases of academic journal editing. Restricted to holders of journal editing internships. Ungraded. Variable credit. *Staff*

393. **Professionalism, Theory, and Power in Legal and Literary Studies.** 3 units.
Fish

COURSES CURRENTLY UNSCHEDULED

209. **Present-Day English**

283S. **Feminist Theory and the Humanities**

383. **Studies in Textual Criticism**

TUTORIALS

Tutorials in specialized subjects of study not available in the courses listed above may be offered to single students or to small groups. Instruction normally will be conducted in weekly sessions, or more frequently if the instructor wishes. Emphasis will be on independent reading and investigation, and on oral and written reports. A substantial amount of writing will be required.

Permission of the instructor and the director of graduate studies is required.

Environment

Professor Christensen, *Chair and Director of Graduate Studies* (216 Biological Sciences); Professors Barber, C. Bonaventura, J. Bonaventura, Dutrow, Forward, Gutknecht, Healy, Johnson, Knoerr, Orbach, Pilkey, Ramus, Richardson, Robertson, Terborgh, and Vesilind; Associate Professors Di Giulio, Kirby-Smith, Kramer, Oren, Reckhow, Richter, Rittschof, Sigmon, and Wolpert; Assistant Professors Faust, Gerhart, Howd, Katul, Lewis, Lozier, Maguire, and Rojstaczer; Professors Emeriti Anderson, Hellmers, Jayne, Kramer, Osborne, Philpott, Stambaugh, and Yoho; Adjunct Professors Boyce, Dieter, Schlesinger, Sizemore, Steen, and Tulis; Adjunct Associate Professor van Schaik

Major and minor work is offered in the areas of natural resource and environmental science/ecology, systems science, and economics/policy. Programs of study and research lead to the A.M., M.S., and Ph.D. degrees. College graduates who have a bachelor's degree in one of the natural or social sciences, forestry, engineering, business, or environmental science will be considered for admission to a degree program. Students will be restricted to the particular fields of specialization for which they are qualified academically. Graduate School programs usually concentrate on some area of natural resource and environmental science/ecology, systems science, or economics/policy, while study in resource and environmental management is more commonly followed in one of the professional master's degree programs of the School of the Environment. For more complete program descriptions and information on professional training in forestry or environmental studies, the *Bulletin of Duke University: School of the Environment* should be consulted.

The specific degrees available in natural resources and the environment through the Graduate School are: the A.M. (with or without a thesis), M.S. (with a thesis), and the Ph.D. Students may be required to demonstrate satisfactory knowledge of one or two foreign languages for the Ph.D. degree. More information on degree and language requirements can be found in the registration and regulations section of this bulletin.

200. **Integrated Case Studies.** A group of two to four students may plan and conduct integrated research projects on a special topic, not normally covered by courses or seminars. A request to establish such a project should be addressed to the case studies director with an outline of the objectives and methods of study and a plan for presentation of the results to the school. Each participant's adviser will designate the units to be earned (up to 6 units) and evaluate and grade the work. Variable credit. *Staff*

201. Forest Resources Field Skills. Introduction to field techniques commonly used to quantify and sample forest resources: trees, soils, water, and animal resources. Dendrology, vegetation sampling, soil mapping, river flow estimation, field water quality sampling, surveying, and use of compass. 2 units. *Davison and Richter*

204. Forest Inventory, Growth, and Yield. Measurement of land and forests for purposes of management, appraisal, purchase, and sale. Techniques for predicting the growth and future yield of stands by various methods. 3 units. *Davison*

205. Ecological Management of Forest Systems (Silviculture). The aim of the course is to equip future resource managers and environmental consultants with knowledge allowing them to propose lower impact practices to individuals and organizations who need to balance wood production with maintenance of environmental quality. Underlying principles of growth, from seed to mature trees, and stand dynamics are explored. Various alternative methods of manipulating growth, stand structure and development, ranging from little to large perturbations of forest systems, are presented and assessed in terms of their effect on resource quality. 3 units. *Oren*

205L. Ecological Management of Forest Systems (Silviculture). Same as 205 with laboratory. 4 units. *Oren*

207. Forest Pest Management. Fundamentals of entomology and plant pathology as appropriate to understanding the impacts of insects and diseases on forest productivity and their assessment for integration into forest management. Regional case examples and complexes are evaluated in terms of pest-population, forest-stand dynamics; economic and societal constraints; treatment strategies; monitoring systems; and benefit-cost analysis. This approach seeks to develop predictive capabilities in long-range pest management and decision making. 3 units. *Stambaugh*

207L. Forest Pest Management. Same as 207 with laboratory which is largely field oriented to focus on diagnostics and impact analysis. 4 units. *Stambaugh*

210. Forest Pathology. Diseases of North American forests and their timbers, with emphasis on current literature and management strategies. Offered on demand. 3 units. *Stambaugh*

210L. Forest Pathology. Same as 210 with laboratory. Field and laboratory diagnosis. Offered on demand. 4 units. *Stambaugh*

211L. Applied Ecology and Ecosystem Management. An application of ecological principles to applied resource and environmental problems with an emphasis on the ecosystem as a basic working unit. Perspectives include such topics as land/water interactions, the patchiness concept, succession, energy flow, productivity, mineral cycling, perturbation effects on ecosystems, and limiting factors. Laboratory studies will focus on the team approach to analyzing the biotic and abiotic components of the ecosystem and impact analysis. Prerequisites: introductory course in biology and ecology. 4 units. *Richardson*

212. Environmental Toxicology. Study of environmental contaminants from a broad perspective encompassing biochemical, ecological, and toxicological principles and methodologies. Discussion of sources, environmental transport and transformation phenomena, accumulation in biota and ecosystems. Impacts at various levels of organization, particularly biochemical and physiological effects. Prerequisites: organic chemistry and vertebrate physiology or consent of instructor. 3 units. *Di Giulio*

213. Forest Ecosystems. Emphasis on the processes by which forests circulate, transform, and accumulate energy and materials through interactions of biologic organisms and the forest environment. Ecosystem productivity and cycling of carbon, water, and nutrients provide the basis for lecture and laboratory. 3 units. *Richter*

215. Environmental Physiology. Examination of the concepts of tolerance, limiting factors, bioenergetics, nutrition, stress physiology, homeostasis, and alleopathy for both plant and animal life. Discussion of procedures for and examples of monitoring physiological perturbations due to resource manipulation. 3 units. *Di Giulio and Oren*

216. Applied Population Ecology. Population dynamics of managed and unmanaged populations. A quantitative approach to exploitation and conservation of animal and plant populations, including harvesting, population viability analysis, population genetics. Prerequisites: introductory statistics, calculus, and computer programming or consent of instructor. 3 units. *Maguire*

217. Tropical Ecology. Ecosystem, community, and population ecology of tropical plants and animals with application to conservation and sustainable development. Prerequisite: a course in general ecology. C-L: Botany 215 and Zoology 215. 3 units. *Terborgh*

218L. Barrier Island Ecology. An integration of barrier island plant and animal ecology within the context of geomorphological change and human disturbance. Topics include: barrier island formation and migration, plant and animal adaptations, species interactions, dune succession, maritime forests, salt marshes, sea level rise, conservation policy, and restoration ecology. Field trips to many of the major North Carolina barrier islands. Strong emphasis on field observation and independent research. (Given at Beaufort.) Prerequisite: introductory biology; suggested: course in botany or ecology. C-L: Botany 218L and Marine Sciences. 6 units. *Evans, Peterson, and Wells (visiting summer faculty)*

219L. Marine Ecology. Factors that influence the distribution, abundance, and diversity of marine organisms. Course structure integrates lectures, field excursions, and independent research projects. Topics include characteristics of marine habitats, adaptation to environment, species interactions, biogeography, larval recruitment, rocky shores, marine mammals, fouling communities, tidal flats, beaches, subtidal communities, and coral reefs. (Given at Beaufort.) Prerequisite: none; suggested—introductory ecology, invertebrate zoology, or marine botany. C-L: Marine Sciences and Zoology 203L. 6 units. *Gerhart*

220. Vegetation Management in Urban Ecosystems (Urban Forestry). Biology and management of woody vegetation, especially trees, across the urban-forest continuum. Special uses and problems of the urban forest are discussed in terms of socioeconomic, legal, arboricultural, and environmental considerations. Management case studies and field trips will be used to gain insights into tree valuation, inventory, and municipal ordinances and administration. 3 units. *Stambaugh*

221. Soil Resources. Emphasis on soil resources as central components of terrestrial ecosystems, as rooting environments for plants, and as porous media for water. Soil physics and chemistry provide the basis for the special problems examined through the course. Laboratory emphasizes field and lab skills, interpretive and analytical. 3 units. *Richter*

222S. Coastal Processes. Waves and currents in the nearshore zone and their role in beach evolution. Linear wave theory and models for beach evolution. Other topics include nearshore currents, tides, estuarine circulation, and field techniques for measurement of nearshore morphology and fluid motions. Term project required. (Given at Beaufort.) Prerequisites: Mathematics 31 and 32. C-L: Geology 201S and Marine Sciences. 2 units. *Howd*

223L. Behavioral Ecology. How ecological factors shape foraging, mating, aggressive, and social behavior. Laboratory experiments and field observations from the Outer Banks environment. Independent projects and seminars. Not open to undergraduates.

(Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. 4 units. *Staff*

224S. Molecular and Cellular Adaptations of Marine Organisms. Marine organisms meet the challenge of living in a hostile and ever-changing environment by numerous adaptive mechanisms. Focus on the underlying cellular and molecular processes. Topics explored with regard to adaptive processes in marine organisms include changes in metabolism, respiration, and vision. The impact of environmental pollutants and human health significance will also be addressed. (Given at Beaufort.) C-L: Cell Biology 270S and Marine Sciences. 2 units. *C. Bonaventura*

225L. Coastal Ecotoxicology and Pollution. Principles of transport, fates, food-web dynamics and biological effects of pollutants in the marine environment. Laboratory to stress standard techniques for assessing pollutant levels and effects. (Given at Beaufort.) Prerequisites: introductory chemistry and biology. C-L: Marine Sciences. 4 units. *Staff*

226L. Marine Mammals. Ecology, social organization, behavior, acoustic communication and management issues. Focused on marine mammals in the Southeastern United States (for example, bottlenose dolphin, right whale, West Indian manatee). Laboratory exercises will consider social organization and acoustic communication in the local bottlenose dolphin population. (Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. 4 units. *Staff*

227L. Biology of Marine Macrophytes. Physiology and ecology of seaweeds, seagrasses, marshgrasses, and mangroves. Biological flux of carbon and nutrients in coastal seas. Ecological consequences of photosynthetic adaptations. Not open to undergraduates. (Given at Beaufort.) Prerequisites: introductory biology and chemistry. C-L: Marine Sciences. 4 units. *Ramus*

228L. Physiology of Marine Animals. Environmental factors, biological rhythms, and behavioral adaptations in the comparative physiology of marine animals. Not open to undergraduates. Four units (fall); six units (summer). (Given at Beaufort.) Prerequisites: introductory biology and chemistry. C-L: Marine Sciences. Variable credit. *Forward*

229L. Biochemistry of Marine Animals. Functional, structural, and evolutionary relationships of biochemical processes of importance to marine organisms. Not open to undergraduates. (Given at Beaufort.) Prerequisites: introductory biology and inorganic chemistry. C-L: Marine Sciences. 4 units. *Rittschof*

230L. Weather and Climate. Overview of the science of meteorology and principles of climatology, especially as applied to problems in ecology and natural resource management. Emphasis on the processes and characteristics of weather phenomena and local and regional climates. General introduction to sources of climatic data and climatic data analysis. Includes laboratory. 4 units. *Knoerr*

231. Climatic Change. Record of changing climate on earth, as determined from the analysis of deep sea sediments, ice cores, lake sediments, and tree rings. (Given at Beaufort.) C-L: Geology 209 and Marine Sciences. 4 units. *Johnson*

232. Microclimatology. Introduction to the micrometeorological processes. Discussion of the integration of these processes and the resulting microclimates in the rural (forest, field, and water surface) and urban environments. Methods for modification of the microclimate. Offered on demand. C-L: Botany 232. 3 units. *Knoerr*

234L. Watershed Hydrology. Introduction to the hydrologic cycle with emphasis on the influence of land use, vegetation, soil types, climate, and land forms on water quantity and quality and methods for control. Development of water balance models. Analysis of precipitation patterns, rainfall and runoff, and nonpoint source impacts. Statistical handling and preparation of hydrologic data, simulation and prediction

models, introduction to groundwater flow, laboratory and field sampling methods. 4 units. *Staff*

235. Air Quality Management. Types, sources, effects of air pollutants. Regulatory framework emphasizing the Clean Air Act Amendments of 1990 and federal, state, local agency implementation. Application of risk assessment, technology, market incentives to air management. Scientific, policy aspects of acid deposition, global climate change, indoor air, mobile sources control. Dispersion modeling, exposure assessment. 3 units. *Vandenberg*

236. Water Quality Management. Types, sources, and effects of pollutants. Water quality standards and criteria. Engineering approaches to water management. Mathematical models and their application to water quality management. Federal regulations, in particular, the Federal Water Pollution Control Act and the Safe Drinking Water Act. Policy analysis for water quality management planning. 3 units. *Reckhow*

238. Hydrologic Transport Processes. Physical and chemical processes governing the transport and fate of contaminants in the terrestrial portion of the hydrologic cycle. An integrated, interdisciplinary approach to quantitative aspects of contaminant transport with emphasis placed on surface water and shallow soil processes. Advection, dispersion, and mixing in streams, lakes, and estuaries; chemical and biological reactions in surface waters and soils; transport through porous media. Case studies involving numerical models of contaminant transport will be used. Prerequisites: Environment 234, 242, or equivalent and familiarity with calculus. 3 units. *Staff*

240. Fate of Organic Chemicals in the Aquatic Environment. Kinetic, equilibrium, and analytical approaches applied to quantitative description of processes affecting the fate of anthropogenic and natural organic compounds in surface and groundwaters and in selected treatment processes, including sorption phenomena, gas transfer, hydrolysis, photochemistry, oxidation-reduction, and biodegradation. Sampling, detection, identification, and quantification of organic compounds in the environment. Gas and liquid chromatography and mass spectrometry. Prerequisites: university-level general chemistry and organic chemistry within last four years. C-L: Civil Engineering 240. 3 units. *Dubay and Faust*

241. Atmospheric Chemistry and Air Pollution. Chemical kinetics and equilibrium applied to the mechanistic and quantitative description of processes affecting the fates of anthropogenic and natural chemicals in the troposphere, on local, regional, and global scales. Direct photolysis; gas-phase photo-formation and fates of ozone, radicals, and other oxidants; gas-phase oxidations of volatile organic compounds; gas-to-drop partitioning; aqueous-phase photoformation and fates of hydrogen peroxide, radicals, and other oxidants in the aqueous phases of clouds, fogs, and aerosols; effects of aqueous-phase reactions on the chemical composition of the troposphere; gas-phase and aqueous-phase oxidations of organic and inorganic compounds; stratospheric ozone depletion. Prerequisites: university-level general chemistry and organic chemistry within last four years. C-L: Civil Engineering 241. 3 units. *Faust*

242. Environmental Aquatic Chemistry. Principles of chemical kinetics and equilibria applied to quantitative description of the chemistry of lakes, rivers, oceans, groundwaters, and selected treatment processes. Equilibrium, steady state, and other kinetic models applied to processes such as the carbonate system, coordination chemistry, precipitation and dissolution, oxidation-reduction, photochemistry, adsorption, and heterogeneous reactions. Prerequisite: university-level general chemistry within last four years. C-L: Civil Engineering 242. 3 units. *Faust*

243. Environmental Biochemistry. Introduction to the (macro)molecules of life and fundamental metabolic pathways. Topics are presented in the context of environmental

perturbations. Fundamental aspects of energetics, proteins, enzymes, carbohydrates, lipids, and nucleic acids. Emphasis on mechanisms of adaptation, molecular controls, and responses to toxicants. (Given at Beaufort.) Prerequisite: organic chemistry. C-L: Cell Biology 243 and Marine Sciences. 3 units. *Bonaventura and Brouwer*

244. Cellular and Molecular Research Techniques. Introduction to the use of electrophoresis, chromatography, enzymology, equilibrium assays, rapid reaction kinetics, microscopy, molecular graphics, and various modes of spectroscopy in analyzing molecules and tissues of organisms collected from polluted and pristine environments. The applicability of techniques of modern molecular biology are discussed in relation to other research techniques used to examine fundamental molecular mechanisms and the adverse effects of pollutants on natural processes. (Given at Beaufort.) Prerequisite: organic chemistry. C-L: Cell Biology 244 and Marine Sciences. 3 units. *Bonaventura and Brouwer*

245. Ecology of Microorganisms. Factors affecting the abundance, distribution, and behavior of microorganisms. Topics include microbial form and function, activities in the environment, and applications to current environmental issues. 3 units. *Shafer*

246. Survey of Occupational Health and Safety. Occupational risks associated with biological, chemical, ergonomic, radiation, and toxic hazards. The nature and scope of occupational hazards, health effects, and risk assessment and management strategies. Open to undergraduates by consent. 3 units. *Staff*

247. Survey of Environmental Health and Safety. Environmental risks from the perspective of global ecology, biology, chemistry, and radiation. The nature and scope of environmental hazards, environmental impacts and health effects, and risk assessment and management strategies. Open to undergraduates by consent. 3 units. *Staff*

248. Solid Waste Engineering. Engineering design of material and energy recovery systems including traditional and advanced technologies. Sanitary landfills and incineration of solid wastes. Application of systems analysis to collection of municipal refuse. Major design project in solid waste management. Prerequisite: Civil Engineering 124L or consent of instructor. C-L: Civil Engineering 248. 3 units. *Vesilind*

251. Statistics and Data Analysis in Biological Science. Elements of statistical inference and estimation including exploratory data analysis, regression, and analysis of variance. Emphasis on biological science applications. Not open to students who have had Mathematics 136 or Statistics 110A, 110B, 112, 113, 114, 210A, or 213. C-L: Statistics 210B. 3 units. *Staff*

252L. Techniques in Environmental Data Analysis. Techniques commonly used by environmental scientists for the analysis of spatial and/or temporal series of data. Topics include regression, Fourier analysis, spectral and cross-spectral analysis, and empirical orthogonal functions. Emphasis on developing a hands-on understanding of the methods and correct interpretation of results. (Given at Beaufort.) Prerequisites: Mathematics 31 and 32 (introductory calculus). C-L: Geology 222L and Marine Sciences. 4 units. *Howd*

253. Biometry. A practically oriented overview of the statistical analysis of biological data. Topics include data collection and experimental design, methods and techniques of data organization, use of computing programs and packages, applications of appropriate parametric and nonparametric statistical techniques, assumptions and problems encountered with biological data analysis, and interpretation of results. Prerequisite: Mathematics 136, Psychology 117, Sociology 133, Statistics 10D, 110, 112, 114, 213, or equivalent. C-L: Biological Anthropology and Anatomy 250. 3 units. *Gerhart and White*

254. Advanced Research Training in Marine Molecular Biology and Biotechnology. Modern molecular biology taught in lectures and laboratory exercises using fish, molluscs, algae, and other marine forms. Topics and techniques include DNA, RNA and protein assays; techniques of gene transfer, amplification and mapping; plasmid isolation; genomic library screening and bacteriological and cell culture techniques. (Given at Beaufort.) Prerequisites: biochemistry and cell biology or equivalent; for undergraduates, consent of instructor required. C-L: Cell Biology 235 and Marine Sciences. 4 units. *Staff*

254L. Advanced Research Training in Marine Molecular Biology and Biotechnology. Same as 254 with laboratory. C-L: Cell Biology 235L and Marine Sciences. 6 units. *Staff*

261. Remote Sensing for Resource Management. An examination of remote sensing systems as sources of information in resource management with an emphasis on aerial photography and multispectral scanners. Emphasis on the interpretation of airborne and space imagery. 3 units. *Davison*

262. Forest Utilization Field Trip. Introduction to utilization in the managed forest and the principal wood-using industries. Taught as a one-week field seminar. May be taken by nonforestry majors. 1 unit. *Staff*

266. Ecology of Southern Appalachian Forests. Field trips to various forest ecosystems in the southern Appalachian Mountains. Species identification, major forest types, field sampling, and history of effects of human activities. Consent of instructor required. 1 unit. *Richter*

270L. Resource and Environmental Economics. The application of economic concepts to private- and public-sector decision making concerning natural and environmental resources. Intertemporal resource allocation, benefit-cost analysis, valuation of environmental goods and policy concepts. Includes laboratory. Prerequisite: introductory course in microeconomics. C-L: Economics 270L and Public Policy Studies 272L. 4 units. *Kramer*

271. Economic Analysis of Resource and Environmental Policies. Case and applications oriented course examining current environmental and resource policy issues. Benefits and costs of policies related to sustaining resource productivity and maintaining environmental quality will be analyzed using economic and econometric methods. Topics include benefit-cost analysis, intergenerational equity, externalities, public goods, and property rights. Prerequisite: Environment 270L or equivalent; Economics 149 recommended. C-L: Economics 272. 3 units. *Staff*

272. Evaluation of Public Expenditures. Basic development of cost benefit analysis from alternative points of view, for example, equity debt, and economy as a whole. Techniques include: construction of cash flows, alternative investment rules, inflation adjustments, optimal timing and duration of projects, private and social pricing. Adjustments for economic distortions, foreign exchange adjustments, risk and income distribution examined in the context of present value rules. Examples and cases from both developed and developing countries. C-L: Economics 261 and Public Policy Studies 261. 3 units. *Conrad*

274. Resource and Environmental Policy. Development of a policy analysis framework for studying resource and environmental policy. Political institutions, interest group theory, public choice theory, role of economics in policy analysis, ethics and values. Application to current and historical U.S. policy issues. Prerequisite: Environment 270L, Public Policy Studies 272, or consent of instructor. C-L: Public Policy Studies 274. 3 units. *Healy*

276S. Selected Public Policies Topics. 3 units. *Staff*

277. Conservation and Sustainable Development I: Concepts and Methods. Agronomic, ecological, and economic concepts of sustainability, with emphasis on application in developing countries; forest, soil, and wildlife resources; models in conservation biology; historical, cultural, and sociological perspectives; policy analysis. 3 units. *Staff*

278. Conservation and Sustainable Development II: Integrated Problem Solving. Approaches to reconciling conservation and development, with emphasis on developing countries. Case studies; project formulation, implementation, and evaluation; institutional policy formation; conflict resolution. 3 units. *Staff*

282S. Environmental Ethics. Selected topics involving values and the environment, for example, extending morality to nature, rights of future generations, environmental aesthetics, diversity and stability, ideological biases in ecological knowledge. Consent of instructor required. C-L: Philosophy 289S. 3 units. *Cooper*

285. Land Use Principles and Policy. Consideration of four major roles of land in the United States: as a producer of commodities, financial asset, component of environmental systems, and location of development. Analysis of market allocation of land, market failure, role of public planning and regulation. C-L: Public Policy Studies 285. 3 units. *Healy*

290. Physical Oceanography. Introduction to the dynamic principles of ocean circulation with an emphasis on large temporal and spatial scales of motion. Topics include wind-driven and density-driven flow, western boundary intensification, mid-ocean, shelf, and tropical circulations. Corequisite: Geology 250. Prerequisites: Mathematics 31 and 32 or consent of instructor. C-L: Geology 203, Mechanical Engineering 290, and Marine Sciences. 3 units. *Lozier*

291S. Geological Oceanography. The geology of ocean basins, including origin, bottom physiography, sediment distribution, and sedimentary processes. Not open to students who have taken Geology 206S. (Given at Beaufort.) C-L: Geology 205S and Marine Sciences. 3 units. *Johnson*

292L. Biological Oceanography. Physical, chemical, and biological processes of the oceans, emphasizing special adaptations for life in the sea and factors controlling distribution and abundance of organisms. Laboratory emphasis. Not open to undergraduates. Four units (spring); six units (summer). (Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. Variable credit. *Ramus or staff*

293. Analysis of Ocean Ecosystems. The history, utility, and heuristic value of the ecosystem; ocean systems in the context of Odum's ecosystem concept; structure and function of the earth's major ecosystems. Not open to undergraduates. (Given at Beaufort.) Prerequisite: one year of biology, one year of chemistry, or consent of instructor. C-L: Marine Sciences. 3 units. *Barber*

294L. Marine Communities. Dynamics of marine communities in the context of current ecological theory. Life history strategies, competition, predation, diversity, and stability; detailed considerations of benthic and pelagic communities. Not open to undergraduates. (Given at Beaufort.) Prerequisites: introductory biology and mathematics. C-L: Marine Sciences. 4 units. *Gerhart*

295L. Marine Invertebrate Zoology. Structure, function, and development of invertebrates collected from estuarine and marine habitats. Not open to students who have taken Biology or Zoology 274L. Not open to undergraduates. Four units (fall); six units (summer). (Given at Beaufort.) Prerequisite: introductory biology. C-L: Marine Sciences. Variable credit. *Kirby-Smith*

297L. Biology of Marine Invertebrates. Structures, functions, and habits of invertebrate animals under natural and experimental conditions. Field trips. Not open to students who have taken Biology 176L. (Given at Beaufort.) Prerequisites: Biology 21L and 22L or equivalents. C-L: Marine Sciences and Zoology 274L. 6 units. *Staff*

299. Independent Studies and Projects. Directed readings or research at the graduate level to meet the needs of individual students. Consent of instructor required. Units to be arranged. Variable credit. *Staff*

302. Models in Forest and Environmental Management. Students learn how to design and choose models for forestry and ecology. Emphasis on using models to develop strategy and evaluate options for culturing forests and related ecosystems. Subjects include timber, wildlife, water, recreation, and cash flow. 3 units. *Boyce*

305. Harvesting Effects on Productivity. Impacts of harvesting on the residual stand, soil properties, water quality, and future site productivity. The integration of harvesting into overall stand management through a full rotation is stressed. Offered on demand. 2 units. *Davison*

306. Dynamic Modeling of Forestry and Natural Resource Management Strategies. Simulation of the financial aspects of silvicultural practices when used to produce timber, wildlife habitat, water, range, and recreational benefits; economics of production; and trade-offs for multiple benefits. Students use actual forest inventories to devise silvicultural strategies, which are simulated with the system dynamics models DYNAST and STELLA on microcomputers. Intensive. Offered on demand. 1 unit. *Boyce*

307. Ecophysiology of Productivity and Stress. Exploration of principles governing stand growth and its response to a variety of stresses. Emphasis on climate, soil resources, and competition. Stresses and their reliefs determined by pollution and the availability of resources as modifiers of the physiological properties of trees. 3 units. *Oren*

312. Wetlands Ecology and Management. The study of bogs, fens, marshes, and swamps. Emphasis on processes within the ecosystem: biogeochemical cycling, decomposition, hydrology, and primary productivity. Ecosystem structure, the response of these systems to perturbations, and management strategies are discussed. A research project is required. Prerequisites: Environment 211 or equivalent and consent of instructor. 3 units. *Richardson*

313. Advanced Topics in Environmental Toxicology. Discussion of current issues. Topics vary but may include chemical carcinogenesis in aquatic animals; biomarkers for exposure and sublethal stress in plants and animals; techniques for ecological hazard assessments; and means of determining population, community, and ecosystem level effects. Lectures and discussions led by instructor, guest speakers, and students. Prerequisite: Environment 212. 3 units. *Di Giulio*

314. Integrated Case Studies in Toxicology. Students are assigned topics relative to their chosen research discipline in toxicology and are asked to develop case studies to present at a roundtable workshop. Emphasis on review and analysis of toxicological problems from a holistic (multidisciplinary) viewpoint. Offered on demand. C-L: Pharmacology 314. 1 unit. *Abou-Donia and Richardson*

316. Case Studies in Environmental and Forest Management. Structured methods for environmental and resource problem solving, including benefit-cost, statistical, and decision analyses, as well as simulation and optimization, are applied to case studies. Previous course work provides a foundation for addressing ecological, economic, ethical, and sociopolitical aspects of management issues. Students work in teams to develop operational management plans which are presented in oral and written form.

Prerequisite: Environment 211, 270, 350, familiarity with a computer programming language, or consent of instructor. 4 units. *Maguire*

317. Topics in Tropical Ecology and Conservation. Discussion of current issues and ideas at the interface between basic and applied science. Lectures, seminars, and discussion with student participation. Prerequisite: Environment 217 or equivalent. 2 units. *Terborgh*

319. Environmental Toxicology and Risk Assessment. Examination of processes that control the transport, fate, and effects of key groups of environmental contaminants. Methods of risk assessment, including modeling, uncertainty analysis, and decision theory. Intensive. 1 unit. *Di Giulio, Faust, and Reckhow*

322L. Microbiology of Forest Soils. Ecology of the microbial populations of forest soils, with emphasis on rhizosphere interactions, root pathogenesis, and mycorrhizae. Includes laboratory. Offered on demand. Prerequisites: consent of instructor; mycology and bacteriology are recommended. 4 units. *Stambaugh*

330L. Environmental Monitoring and Instrumentation. Methods of measuring and monitoring the earth's physical environment with emphasis on water and air resources. Characteristics and uses of contemporary sensors, measurement and data acquisition systems. Methods of obtaining and processing computer compatible data records. Includes laboratory. Offered on demand. C-L: Botany 330L. 4 units. *Knoerr*

333. Basic Groundwater Hydrology. Basic principles, concepts, and methods of groundwater hydrology. Topics include water storage and transmission characteristics of rocks, physical features of U.S. groundwater regions, problems related to development and protection of the groundwater resource. Intensive. 1 unit. *R. Heath*

335. Water Quality Modeling. Development and evaluation of simulation models of surface water quality. Mechanistic descriptions of aquatic ecosystems and materials transport. Statistical methods for monitoring design and trend detection. Uncertainty analysis. Prerequisites: Environment 236 and 350. 2 units. *Reckhow*

340. Biohazard Science. Philosophy of safety; etiology, infectivity, and transmissibility of disease; immunity and resistance; occupational and nosocomial infections; aerobiology; biotechnology; disinfection and sterilization; biocontainment and facility design; and safety management. Prerequisite: general microbiology or consent of instructor. 3 units. *Tulis*

341L. Methods in Biohazard Science. Fundamentals of disinfection, sterilization, and biocidal materials methodology, inactivation kinetics and dosimetry; medical waste management; mutagenicity, pyrogenicity, and PCR testing; laminar flow cabinet certification; microbiologic surface and air sampling; respirator assessment; laboratory audits and regulatory compliance. Prerequisite: Environment 340 or consent of instructor. 4 units. *Staff*

342. Bioaerosols. Principles of aerobiology; sick-building syndrome and building-related illness; ventilation, filtration, and humidification systems; chemical and biological pollutants; health effects; sampling and assessment of bioaerosols; remediation measures; handling indoor air quality perceptions. Consent of instructor required. 2 units. *Thomann and Tulis*

343. Hazard Management, Law, and Ethics. Economics and ecology; survey of federal and state laws; legal basis for regulation; enforcement, including inspections and audits, permits and licensing, and citations, injunctions, and penalties; management accountability; ethics in science and medicine; risk assessment and management; policy development and implementation. Consent of instructor required. 3 units. *Warren*

350. Applied Regression Analysis. Regression analysis with nonexperimental data using ordinary least squares. Emphasis on assumption violations: consequences and correctives. Analysis of variance and time series analysis using Box-Jenkins methods as time permits. Applications to problems in natural resource management. Prerequisite: Environment 251 or equivalent. 3 units. *Staff*

351. Computer-Based Map Analysis with Geographic Information Systems. Introduction to computer-based map analysis systems (geographic information systems). Use of map algebra in computer analyses of spatially distributed map information. Applications in analyzing and solving natural resource management problems. 3 units. *Knoerr*

355. Optimization Methods for Resource Management. Introductory survey of optimization techniques useful in resource management and environmental decision making. Numerical techniques for unconstrained optimization, linear programming, dynamic programming, and optimal control methods. Consent of instructor required. 3 units. *Staff*

366. Mathematical Modeling of Lake and Reservoir Water Quality. Practical application of mathematical models of lake and reservoir water quality. The major objective is to expose the participant to a wide variety of techniques that are useful in predicting the responses of lakes and impoundments to pollutants. Statistical and mass balance models are included. Knowledge of elementary calculus and statistics is recommended. Intensive. Offered on demand. 1 unit. *Chapra and Reckhow*

367. Laird, Norton Distinguished Visitor Series. Examination of concepts, practices, and policies employed in the management of industrial and public forests; discussion of the problems of large-scale forest management. 1 unit. *Staff*

372. Advanced Natural Resource Economics. Methods for evaluating conservation, development, and restoration of renewable and exhaustible environmental resources. Introduction to the role of public goods and externalities in designing policies to sustain resource productivity and maintain environmental quality (developed in more detail in 373). Topics include renewable resources, exhaustible resources, intergenerational equity, property rights, and optimal control. Consent of instructor required. C-L: Economics 372. 3 units. *Staff*

373. Advanced Environmental Economics. Examination of the economic measurement of environmental benefits and damages. Consideration of economic concepts for the design of environmental policies. Topics include externality theory, public goods, contingent valuation, and hedonic models. Consent of instructor required. C-L: Economics 373. 3 units. *Kramer*

385. Decision Theory and Risk Analysis. Bayesian decision theory, including probability, subjective probability, utility theory, value of sample information, and multiattribute problems. Applications of decision theory in resource and environmental policy-making. Ecological risk assessment, including case studies. Prerequisite: Environment 251 or equivalent. 3 units. *Maguire and Reckhow*

388. Seminar in Resource and Environmental Policy. Discussion of the political, legal, and socioeconomic aspects of public and private action in environmental quality control and management. Consent of instructor required. Variable credit. *Staff*

389. Seminar in Conservation and Environmental History. Traces the evolution of conservation and environmental movements and the development of environmental ethics. History of agencies, industries, associations, and citizen groups as well as overall policies for land and resources. Comparison of parallel developments in Canada. Consent of instructor required. C-L: History 389. 3 units. *Steen*

393. Professional Writing. Techniques in writing grant proposals, technical reports, and environmental impact statements. (Given at Beaufort.) 2 units. *Staff*

395. Coastal Environmental Speaker Series. Examination of contemporary issues in coastal environmental management. Guest speakers. (Given at Beaufort.) 1 unit. *Staff*

COURSES CURRENTLY UNSCHEDULED

296L. Benthic Marine Algae

Genetics

Professors F. Ward, *Director* (immunology); Professors Antonovics (botany), Bastia (microbiology), Boynton (botany), Counce (cell biology), Endow (microbiology), Gillham (zoology), Greenleaf (biochemistry), Hsieh (biochemistry), Joklik (microbiology), Keene (microbiology), Kredich (medicine and biochemistry), Laurie (zoology), Modrich (biochemistry), Nevins (genetics and microbiology), Nicklas (zoology), Rausher (zoology), Roses (neurobiology), Shaw (chemistry), Steege (biochemistry), Uyenoyama (zoology), and Webster (biochemistry); Associate Professors Burdett (microbiology), Cullen (genetics and microbiology), Greene (biochemistry), Kiehart (cell biology), Kreuzer (microbiology), Linney (microbiology), Schachat (cell biology), and Vilgalys (botany); Assistant Professors Been (biochemistry), Davis (cell biology), Dong (botany), Fehon (zoology), Garcia-Blanco (microbiology), Garrett (biochemistry), Heitman (genetics and pharmacology), Hershfield (biochemistry), Horowitz (microbiology), Kaufman (biochemistry), Kohorn (botany), Marchuk (genetics), Markert (immunology), Ostrowski (microbiology), Pickup (microbiology), Seldin (microbiology), Sun (botany), Swenson (cell biology), Titus (cell biology), and Wharton (genetics and microbiology); Adjunct Professors Drake (National Institute of Environmental Health Sciences), Judd (National Institute of Environmental Health Sciences), Kunkel (National Institute of Environmental Health Sciences), and Resnick (National Institute of Environmental Health Sciences)

The graduate program in genetics provides study and research opportunities in a wide array of experimental systems. The integrated program is administered jointly by the Department of Genetics and the interdepartmental University Program in Genetics, with a faculty drawn from several of the biological sciences departments (biochemistry, botany, cell biology, chemistry, immunology, microbiology, molecular cancer biology, neurobiology, pharmacology, and zoology). Graduate students registered in any of the biological sciences departments may apply to the faculty of the genetics program to pursue study and research leading to an advanced degree. Requests for information describing more completely the research interests of the staff, facilities, and special stipends and fellowships should be addressed to the Director, University Program in Genetics, Box 3565, Duke University Medical Center, Durham, North Carolina 27706.

215. Genetic Mechanisms. A comprehensive treatment of molecular and classical genetic mechanisms, emphasizing gene structure and function, genetic analyses in various experimental systems, as well as the behavior of chromosomes in replication, segregation, and recombination. C-L: Biochemistry 215. 4 units. *Nevins and staff*

316S. Genetics Student Research Seminars. Seminars presented by genetics program students on their current research. Required course for all graduate students specializing in genetics. 1 unit. *Endow and Kohorn*

350. Genetics Colloquium. Lectures, discussion sections, and seminars on selected topics of current interest in genetics. Required of all students specializing in genetics. Prerequisites: a course in genetics and consent of instructor. 1 unit. *S. Garrett and staff*

Geology

Professor Corliss, *Chair* (338 Old Chemistry); Professor Heron, *Director of Graduate Studies* (205 Old Chemistry); Professors Barber, Haff, Johnson, Karson, Kay, Livingstone, Perkins, Pilkey, and Schlesinger; Associate Professors Baker and Malin; Assistant Professors Boudreau, Howd, Klein, Lozier, and Rojstaczer

The Department of Geology offers graduate work leading to the M.S. and Ph.D. degrees. An undergraduate degree in geology is not a prerequisite for graduate studies. For the M.S. degree a student must have had or must take a summer field geology course (or equivalent experience), mineralogy, igneous and metamorphic rocks, stratigraphy or sedimentation, and structural geology. In addition, the student must have had one year of college chemistry, one year of college physics, and mathematics through calculus. Requirements for the Ph.D. are decided on an individual basis. Graduate courses and research in the Department of Geology provide specialized training in the fields of coastal geology, earth surface processes and geomorphology, facies analysis, geological oceanography and limnology, geophysics, high-temperature geochemistry, hydrogeology, igneous petrology, low-temperature geochemistry, micropaleontology, paleoceanography, sedimentary petrology, seismology, and structural geology/tectonics.

For Seniors and Graduates

200. Beach and Coastal Processes. The study of sedimentary processes and geomorphology of nearshore environments with emphasis on both developed and undeveloped barrier island systems. 3 units. *Pilkey*

201S. Coastal Processes. Waves and currents in the nearshore zone and their role in beach evolution. Linear wave theory and models for beach evolution. Other topics include nearshore currents, tides, estuarine circulation, and field techniques for measurement of nearshore morphology and fluid motions. Term project required. (Given at Beaufort.) Prerequisites: Mathematics 31 and 32. C-L: Environment 222S and Marine Sciences. 2 units. *Howd*

203. Physical Oceanography. Introduction to the dynamic principles of ocean circulation with an emphasis on large temporal and spatial scales of motion. Topics include wind-driven and density-driven flow, western boundary intensification, mid-ocean, shelf, and tropical circulations. Corequisite: Geology 250. Prerequisites: Mathematics 31 and 32 or consent of instructor. C-L: Environment 290, Mechanical Engineering 290, and Marine Sciences. 3 units. *Lozier*

205S. Geological Oceanography. The geology of ocean basins, including origin, bottom physiography, sediment distribution, and sedimentary processes. Not open to students who have taken Geology 206S. (Given at Beaufort.) C-L: Environment 291S and Marine Sciences. 3 units. *Johnson*

206S. Principles of Geological Oceanography. Geological aspects of the ocean basins including coastal to deep water sediment types and sedimentation processes, sea floor physiography and environmental problems. 3 units. *Pilkey*

208S. Paleoceanography. Geology, paleoceanography, and evolution of the oceans, ocean basins, and marine biota based on analysis of deep-sea sedimentary sequences. 3 units. *Corliss*

209. Climatic Change. Record of changing climate on earth, as determined from the analysis of deep sea sediments, ice cores, lake sediments, and tree rings. (Given at Beaufort.) C-L: Environment 231 and Marine Sciences. 4 units. *Johnson*

212. Carbonate Facies Analysis: Recent and Ancient. Origin, distribution, and diagenetic alteration of recent carbonate sediments and their ancient analogs. Prerequisite: Geology 110L. 3 units. *Perkins*

215. Clastics Facies Analysis: Recent and Ancient. Modern clastic depositional systems and their ancient analogs. Prerequisite: Geology 110L. 3 units. *Heron*

216. Field Analysis of South Florida Carbonates. Analysis of recent sediments and organisms and their Pleistocene analogs. One-week field trip. Pass/fail grading only. Prerequisite: Geology 110L or consent of instructor. 1 unit. *Perkins*

218. Geological Fluid Mechanics. Physical properties of fluids. Continuity, momentum, and energy principles. Laminar and turbulent flow; potential flow; open channel flow. Applications to stream and watershed hydraulics, sediment transport, and other geological phenomena. Corequisite: Geology 250. Prerequisites: Engineering 75L, Mathematics 31 and 32, or Physics 41L and 42L. 3 units. *Haff*

219. Sediment Transport. The processes by which wind and water move sedimentary material. Corequisite: Geology 250. Prerequisites: Civil Engineering 122L or Geology 41 and 218. 3 units. *Haff*

220. Earth Surface Processes and Geomorphology. The origin, nature, and significance of natural features on the earth's surface. Content varies from year to year. Prerequisites: open to graduates and advanced undergraduates with consent of instructor. 3 units. *Haff*

221. Hydrogeology. Theory of groundwater flow and solute transport with application to geologic processes. Corequisite: Geology 250. Prerequisite: Chemistry 12L, Mathematics 103, Physics 42L or 52L, or consent of instructor. 3 units. *Rojstaczer*

222L. Techniques in Environmental Data Analysis. Techniques commonly used by environmental scientists for the analysis of spatial and/or temporal series of data. Topics include regression, Fourier analysis, spectral and cross-spectral analysis, and empirical orthogonal functions. Emphasis on developing a hands-on understanding of the methods and correct interpretation of results. (Given at Beaufort.) Prerequisites: Mathematics 31 and 32 (introductory calculus). C-L: Environment 252L and Marine Sciences. 4 units. *Howd*

223. Numerical Methods in Hydrogeology. Forward and inverse modeling of groundwater flow and transport. Corequisite: Geology 250. Prerequisite: Computer Science 8 or 53, Geology 221, Mathematics 103, or consent of instructor. 3 units. *Rojstaczer*

225S. Advanced Topics in Hydrogeology. Hydrologic controls on the chemical and physical state of the earth's crust. Prerequisite: Geology 221 or consent of instructor. 3 units. *Rojstaczer*

233S. Oceanic Crust and Ophiolites. Structure, tectonics, petrology, and geochemistry of oceanic spreading environments and ophiolite complexes. Prerequisites: Geology 106L and 130 or consent of instructor. 3 units. *Karson*

237S. Structure and Evolution of the Appalachian Orogen. Overview of sedimentation, deformation, and metamorphism responsible for the development of the Appalachian Mountain Belt from Newfoundland to Alabama in the context of plate tectonics. Prerequisites: Geology 106L, 110L, and 130 or consent of instructor. 3 units. *Karson*

249. Marine Micropaleontology. Introduction to marine microfossils, basic principles of micropaleontology and stable isotope geochemistry with applications to paleoceanography. Lectures and laboratory. 3 units. *Corliss*

250. Mathematical Methods in Geology. Overview of quantitative methods used in geologic modeling and data analysis. Prerequisites: Geology 41, Mathematics 32, Physics 41L and 42L. 3 units. *Staff*

251. Introduction to Geophysics. A survey of the earth's heat flow, gravitational, magnetic, and electrical potential fields, and global seismology. Derivation of basic relationships and their application to the solution of geological problems. Corequisite: Geology 250. Prerequisite: upper-division mathematics or science courses. 3 units. *Malin*

252. Seismic Exploration of the Lithosphere. A survey of seismic wave generation, propagation, detection, analysis, and interpretation in the continental and oceanic lithosphere with practical applications to geological and industrial problems. Prerequisites: upper-division mathematics or science courses and Geology 250. 3 units. *Malin*

255. Theoretical Geophysics I: Diffusion and Wave Motion in the Earth, Part I. Theoretical and practical quantitative methods for seismological and groundwater research. Differential and integral equations for diffusion and wave motion; analytical solutions and numerical methods. Elementary continuum mechanics. Time series analysis. Emphasis varies depending on enrollment. Prerequisite: enrollment in an advanced degree program in earth sciences or related fields, or consent of instructors. 3 units. *Malin and Rojstaczer*

256. Theoretical Geophysics II: Diffusion and Wave Motion in the Earth, Part II. Theoretical and practical quantitative methods for seismological and groundwater research. Differential and integral equations for diffusion and wave motion; analytical solutions and numerical methods. Elementary continuum mechanics. Time series analysis. Emphasis varies depending on enrollment and the contents of Geology 255. Prerequisite: Geology 255 or consent of instructors. 3 units. *Malin and Rojstaczer*

258S. Advanced Topics in Geophysics: Interdisciplinary Approaches to Problems in Tectonics, Seismology, and the Environment. Crustal structure of the western United States; use of seismic reflection and microearthquake data for imaging active geological processes, earthquake prediction; scattering of seismic waves. Consent of instructor required. 3 units. *Malin*

260S. Applied Subsurface Stratigraphy. Overview and application of tools, techniques, and procedures for analysis of subsurface strata. Logging methods for cuttings and cores, principles and application of wire-line logs, interpretation of seismic sections, mapping and correlation procedures, and the application of computers to stratigraphic analysis. Prerequisite: Geology 110L. 3 units. *Perkins*

271. Isotope Geochemistry. Theory and applications of stable and radioactive isotope distributions in nature. Prerequisites: Chemistry 12L and Mathematics 32. 3 units. *Baker*

272. Biogeochemistry. Processes controlling the circulation of carbon and biochemical elements in natural ecosystems and at the global level, with emphasis on soil and surficial processes. Prerequisite: Chemistry 12L or equivalent. 3 units. *Schlesinger*

273S. Analytic Techniques. An introduction to advanced analytic procedures used in the earth sciences: such as electron microbeam techniques (scanning electron microscopy, electron microprobe analysis) and plasma emission/absorption spectroscopy. Consent of instructor required. 3 units. *Boudreau and Klein*

275. Economic Geology. Geology and geochemistry of ore deposits. Consent of instructor required. 3 units. *Baker and Boudreau*

285S. Layered Intrusions. Survey of layered igneous intrusions and current theories on crystallization and other processes in mafic magmas. Offered alternate years. Prerequisites: Geology 105L and 106L or consent of instructor. 3 units. *Boudreau*

292. Computer Methods in Geology. Techniques used in the geological sciences including simulation and forward modeling, inverse and least squares methods, statistical methods and exploratory data analysis as well as graphics. Prerequisites: Computer Science 53 and Mathematics 32, or consent of instructor. 3 units. *Staff*

295S. Advanced Topics in Geology. Topics, instructors, and credits to be arranged each semester. Variable credit. *Staff*

For Graduates

371, 372. Advanced Topics in Geology. To meet the individual needs of graduate students for independent study in various environmental sedimentary fields. Variable credit. *Staff*

COURSES CURRENTLY UNSCHEDULED

214S. Sedimentary Petrography

217. Field Analysis of Ancient Sedimentary Sequences

230S. Advanced Topics in Structural Geology and Tectonics

236S. Lithosphere Plate Boundaries

239S. Advanced Topics in Structural Geology and Tectonics

269. Theoretical Geochemistry

270. Sedimentary Geochemistry

271. Isotope Geochemistry

283S. Experimental Methods in Geology

German Studies Program

Professor Rolleston, *Chair* (102 Languages); Associate Professor Morton, *Director of Graduate Studies* (07 Languages); Professors Alt (German), Antonovics (botany), Bernstein (law), Borchardt (German), Brandon (philosophy), Counce (cell biology), Herzog (divinity), Hillerbrand (religion), Jameson (literature), Kitschelt (political science), Klopfer (zoology), Lahusen (Slavic), Osborn (religion), Silbiger (music), Steinmetz (divinity), Surin (literature), and Todd (music); Associate Professors Berger (divinity), Gillespie (political science), Gilliam (music), Koonz (history) and Robisheaux (history); Assistant Professors Cernuschi (art), Coles (political science), Hacohen (history), Hell (German), Janoski (sociology), Van Miegroet (art), Pfau (English), Rasmussen (German), Risholm (German), and Stiles (art); Adjunct Associate Professor Ward (philosophy)

The Interdisciplinary Program in German Studies offers graduate work leading to the A.M. and Ph.D. degrees. A student's program will be structured among four general disciplinary areas: history and society, literature and linguistics, fine arts and music, philosophy and theory. All students will do some course work in each of the areas, with additional basic requirements in literature and linguistics. A student will elect one of the four areas for comprehensive study; the dissertation topic will normally emerge from that specializing process, and will be grounded in the appropriate disciplinary methodology. Prior to admission to Ph.D. candidacy, students must demonstrate a reading knowledge of at least one language other than English or German. Determination of

which language or languages fulfill this requirement will depend on the student's chosen area of concentration and specific research plans.

A qualifying examination, to be taken in three parts, must be passed before a student may proceed to candidacy and the writing of the dissertation. Part I, to be taken at the end of the first full year of study, will be a general examination devoted to major issues and topics in German history and culture. (Students concluding their studies at this point will be asked to submit an A.M. essay and to take a final examination for the master's degree.) Part II, the Ph.D. preliminary examination, will be devoted to a single historical period, problem, or genre in the student's chosen area of concentration and will be based on a reading list approved by the student's chosen faculty committee. For Part III, to be devoted to the dissertation proposal, the student will evolve and master the bibliography for the anticipated dissertation, articulate the methodological and research problems involved, and present a substantial sample of the project.

Students in other departments needing a course in German for Reading Knowledge should see the Undergraduate Bulletin.

Courses in the Department of Germanic Languages and Literature

200S. Proseminar: Introduction to Literary Criticism. Literary theory within the framework of Germanistik, combining a survey of the major critical approaches which developed after 1945 with the discussion of several paradigmatic readings of literary texts. Approaches studied include New Criticism, hermeneutics, Marxist critical theory, reception aesthetics, structuralism, poststructuralism, and feminist literary criticism(s). 3 units. *Hell*

201. Introduction to Middle High German: The Language of the German Middle Ages and Its Literature. Fundamentals of medieval German language acquired through readings in the original Middle High German of Arthurian romance, heroic epic, and courtly poetry. C-L: Medieval and Renaissance Studies. 3 units. *Rasmussen*

202S. Medieval Seminar. Topics may include: heroic epic, courtly epic, medieval poetics, German lyric poetry from the twelfth to the fifteenth century. Solid reading knowledge of modern German and some knowledge of medieval German required. C-L: Medieval and Renaissance Studies. 3 units. *Rasmussen*

203S. Sex, Gender, and Love in Middle High German Literature. Historical contexts for emergence of courtly love and the role of desire and interpretation in Gottfried von Strassburg's *Tristan und Isolde*, courtly love lyric, "maere." C-L: Medieval and Renaissance Studies. 3 units. *Rasmussen*

210S. Renaissance and Reformation. The development of "personality" from "type" to "individual" in German culture in the great transition from medieval to early modern times, with examples from literature, history, art, architecture, music, science, and religion. Emphasis on the Italian connection, northern mysticism, Prague in the fourteenth century, fifteenth-century poetry and prose, and Luther. C-L: Medieval and Renaissance Studies. 3 units. *Borchardt*

215S. German Baroque Literature. German literature of the grand gesture, of performance, of public posture; poetry of rhetoric; prose of the scoundrel, adventurer, and ne'er-do-well. C-L: Medieval and Renaissance Studies. 3 units. *Borchardt*

220S. Reason and Imagination: The German Eighteenth Century. Advanced study of selected topics, from the beginnings of Enlightenment to the transition to Romanticism. 3 units. *Morton*

225S. Introduction to Goethe. Major works of lyric, narrative, drama, and theory, throughout Goethe's career. 3 units. *Morton*

226S. Goethe's *Faust*. Goethe's masterpiece and life's work, conceived as a summation of Western literature and mythology for the modern age. 3 units. *Morton*

227S. Goethe Seminar. Selected texts or other aspects of Goethe's life and work not treated in German 225S or 226S. Topics may include autobiography, scientific writings, longer novels, late lyrics, literary theory and criticism, as well as others. 3 units. *Morton*

229S. Schiller: Aesthetic Theory and Practice. The nature and function of the artist and the work of art, in Schiller's essays, poetry, and dramas. 3 units. *Borchardt, Morton, or Rolleston*

230S. German Romanticism. The emergence in the 1790s of a new cultural language: categories of self, history, interpretation, irony, and revolution. Theory, fiction, and poetry by Novalis, the brothers Schlegel, Tieck, Brentano, Eichendorff, Hoffmann, and Heine. 3 units. *Rolleston*

232S. The Lyric: Goethe to the Present. Poetry and its cultural meanings from versions of the modern *Ich* generated by Goethe, Hölderlin, and the romantics to the ironic new subjectivity of the 1970s. Emphasis on Mörike, Heine, Droste-Hülshoff, Rilke, Benn, Celan, Enzensberger, and Karin Kiwus. 3 units. *Rolleston*

233S. German Theater as Anti-Drama. The story of modern and postmodern drama with emphasis on Lenz, Büchner, Grabbe, Schnitzler, Brecht, Frisch, Dürrenmatt, Handke, expressionist drama, and Piscator's political theater. 3 units. *Alt*

235S. Nineteenth-Century German Literature. Topics vary: poetry, prose, drama; Kleist, Heine, Büchner, Keller, Meyer, Gotthelf, Grillparzer, Mörike, Storm, Freytag, Hebbel, Fontane. 3 units. *Alt*

236S. Empires of the Mind: Nineteenth-Century German Ideas. Selected topics in politics, religion, society, and history in the nineteenth century: Heine, Hegel, Schopenhauer, Feuerbach, Marx, Nietzsche, Burckhardt, Treitschke, Ranke, D.F. Strauss, Tönnies, Weber, Freud. 3 units. *Alt*

244A, S. International Expressionism. Not open to students who have taken Art 244S or German 244S. See C-L: Art 244A. 3 units. *Cernuschi and Rolleston*

244B, S. International Modernism. See C-L: Art 244B. 3 units. *Cernuschi and Rolleston*

245S. The Twentieth Century. The major movements and writers from the expressionists, Thomas Mann, Kafka, Rilke, and Brecht, to Böll, Grass, Handke, and Christa Wolf. Emphasis on relations between text and history: World War I, Weimar, Third Reich, and the struggle to integrate past and present in post-Holocaust literature. 3 units. *Rolleston*

246. German Letters in the Third Reich and in Exile. German literature, drama, and film inside and outside Nazi Germany. Theoretical readings in Bloch, Benjamin, and others. 3 units. *Hell*

247S. Postwar German Literature. The development of German literature after 1945. Topics vary: German literature between 1945 and the founding of the two states; the GDR novel and the question of realism; GDR drama after Brecht; West German literature. 3 units. *Hell*

250S. German Literature and Classical Antiquity. The reception of Greece and Rome in German letters; the triumph and decline of classical rhetoric; the idea of the "classical"; antiquity as model and reproach. 3 units. *Borchardt*

253S. The Image of America in German Literature. Selected readings in the myth of America (Jantz's "America in German Poetry and Thought"), including various genres from the eighteenth to the twentieth centuries, specifically texts of Goethe, Heine, Sealsfield, Kürnsberger, Willkomm, Gerstäcker, Lenau, Solger, Kafka, Brecht, and Frisch. 3 units. *Alt*

260. History of the German Language. Phonology, morphology, and syntax of German from the beginnings to the present. C-L: Medieval and Renaissance Studies. 3 units. *Rasmussen*

261. Second-Language Acquisition Theory and Practice. Modern teaching techniques; problems in the teaching of German on the secondary and college levels. Analysis and evaluation of textbooks, related audiovisual materials, and computer programs. 3 units. *Staff*

262. Applied Linguistics. The application of modern linguistic principles to a systematic study of the phonetics, morphology, and syntax of modern German. 3 units. *Staff*

265, 266. Elementary German for Business and Law. An accelerated course providing the fundamentals of German grammar, syntax, and culture, with special attention to the terminology of business and law. Exposure to audio- and computer-assisted instructional materials. Open only to graduate and professional school students. 3 units each. *Staff*

270. Consciousness and Modern Society. The blend of philosophy, literature, and sociology in German thinking about actual and possible societies. The idea of consciousness as producing involvement, detachment, or transformation. Marx, Nietzsche, Lukacs, Freud, Marcuse, Benjamin, Adorno, and Habermas. Taught in English. 3 units. *Rolleston*

271S. Contemporary Theory and the German Tradition. The reorientation of Western thought toward theories of knowledge and of language, from the eighteenth century to the present, and the significance of that paradigm shift for contemporary theory of literature and literary criticism. Readings in Kant, Herder, Mauthner, Wittgenstein, Heidegger, Habermas, and Apel. Taught in English. 3 units. *Morton*

300S. The Discipline of Germanistik: A Historical Survey. A study of trends in scholarly criticism within the context of German culture and politics beginning in the 1810s with the origins of *Germanistik* as a university discipline. Topics may include: the invention of philology and the romantic enterprise; positivism and *Geistesgeschichte*; the politics of *Germanistik*, 1933-45; *Germanistik* in Europe and the United States after 1945. 3 units. *Alt, Borchardt, or Rasmussen*

301. German Studies: Theory and Practice. German studies at the intersection of various discourses (such as feminism, psychoanalysis, new historicism), questioning traditional concepts such as national identity, history, and language. Interdisciplinary issues may include: the relationship of literature, the unconscious and technology; the cinematic representation of Nazi history; architecture, monuments, and "German" space. Texts might include works by Kafka, Freud, Marx, Spengler, and Schinkel as well as texts by individuals whose work has been excluded from more traditional "Germanistik" courses. 3 units. *Risholm*

COURSES CURRENTLY UNSCHEDULED

231S. Romantic Outsiders

240S. Naturalism and Beyond: The Turn of the Century

- 241S. Nietzsche
- 242S. Expressionism
- 251S. Germanic Mythology and Its Critics
- 252S. The Mystical Tradition
- 254S. Literature by Women
- 255S. Paradigmatic Issues in Literary Theory
- 272S. The German Literature of Fantasy
- 273S. Franz Kafka and Thomas Mann
- 274S. The Image of America in German Literature
- 275S. German Women Writers
- 321, 322. Germanic Seminar

GERMAN STUDIES COURSES IN OTHER DEPARTMENTS

Art and Art History

- 243S. Topics in Netherlandish and German Art
- 297S. Topics in Art since 1945
- 299S. Critical Theory

History

- 204. German Society, 1914-1945
- 253S, 254S. European Diplomatic History, 1871-1945
- 258S. Social Conflict in Weimar and Nazi Germany

Literature

- 251. History of Criticism
- 252. Criticism and Literary Theory in the Twentieth Century
- 281. Paradigms of Modern Thought
- 283. Modernism
- 285. Literature and Ideology
- 293. Seminars in Literature and History

Music

- 222. Music in the Middle Ages
- 223. Music in the Renaissance
- 224. Music in the Baroque Era
- 225. Music in the Classic Era
- 226. Music in the Nineteenth Century
- 227. Music in the Twentieth Century
- 236. Nineteenth-Century Piano Music

Philosophy

- 231S. Kant's *Critique of Pure Reason*
- 232S. Recent Continental Philosophy
- 233S. Methodology of the Empirical Sciences
- 234S. Problems in the Philosophy of Biology
- 235S. Nineteenth-Century German Philosophy

Political Science

- 216S. Evolution of European Marxism
- 225S. Topics in Comparative Government and Politics: Western Europe
- 228S. Nineteenth- and Twentieth-Century Political Philosophy
- 231S. Crisis, Choice, and Change in Advanced Democratic States
- 236S. Hegel's Political Philosophy
- 239. Comparative History and International Studies
- 247. Politics and Philosophy of Self and Other

Psychology: Social and Health Sciences

- 204S. Great Ideas in Psychology

Religion

- 228. Twentieth-Century Continental Theology
- 231S. Seminar in Religion and Contemporary Thought
- 232S. Religion and Literary Studies
- 236. Luther and the Reformation in Germany
- 248. The Theology of Karl Barth
- 297. Philosophical and Theological Discourses on Modernity
- 320. Theology, Power, and Justice
- 322. Nineteenth-Century European Theology
- 338. Calvin and the Reformed Tradition
- 339. The Radical Reformation

Slavic Languages and Literatures

- 210. Literature and Criticism of Socialist Realism
- 250. Trends in Russian and East European Literary Criticism and Beyond

Sociology

- 206. Sociological Theory

Divinity School Courses

- 201. Christian Thought in the Middle Ages
- 241. Problems in Reformation Theology
- 262. Marxist Ideology and Christian Faith
- 272. Theology of Paul Tillich
- 303. Philosophical Method in Religious Studies
- 328. Twentieth-Century European Theology

Health Administration

A concentration in Health Administration is offered through the Masters in Business Administration degree program of the Duke University Fuqua School of Business. Please contact that school directly for more information.

History

Professor Chafe, *Chair* (215 Carr); Professor Wood, *Director of Graduate Studies* (212A Carr); Professors Cahow, Cell, Davis, Dirlik, Durden, Gaspar, Gavins, Goodwyn, Gordon, Herrup, Hewitt, Keyssar, Kuniholm, Lerner, Mauskopf, Miller, Oates, Reddy, Richards, Roland, W. Scott, TePaske, Thompson, and Witt; Associate Professors English, Ewald, James, Koonz, Nathans, Neuschel, and Robisheaux; Assistant Professors French, Green, J. Scott, Thorne, and Wigen; Professors Emeriti Colton, Ferguson, Franklin, Holley, Parker, Preston, Ropp, A. Scott, Watson, and Young

The Department of History offers graduate work leading to the A.M. and Ph.D. degrees. Candidates for the A.M. degree must have a reading knowledge of at least one ancient or modern foreign language related to their programs of study and have completed successfully a substantial research paper, or two seminar papers, normally the product of a year's seminar or two semester courses. The paper(s) must be examined and approved by three readers: the supervising professor and two other professors from the graduate staff. Students anticipating a May degree must have their papers read and approved by April 15; those anticipating a September degree must have their papers read and approved by August 1.

Candidates for the degree of Doctor of Philosophy prepare themselves for examinations in four fields, at least three of which shall be in history. The choice of fields is determined in consultation with the student's supervisor and the director of graduate studies. The department offers graduate instruction in the broad historical areas of North America; Latin America; Great Britain and the Commonwealth; ancient, medieval, and Renaissance Europe; modern Europe; Russia; Japan; China; South Asia; military; history of science, technology, and medicine; and in the comparative and thematic fields of women's history, environmental history, diplomatic history, labor history, and slave societies. The candidate for the Ph.D. degree must have a reading knowledge of two

foreign languages to be picked in conjunction with the candidate's supervisor. In certain cases, an alternative to the second language may be chosen if approved by both the candidate's supervisor and the director of graduate studies. Such an alternative must take the form of successful completion of a course or courses which would appreciably increase the candidate's methodological proficiency, such as a graduate course in statistics, archaeology, demography, numismatics, cartography, or a summer training program for developing methodological skills. A course or courses in a discipline outside history—for example, anthropology, literature, sociology, political science, ecology, geography—will not usually qualify as an alternative to a second language. Whether satisfied by two languages or by one language and an alternative, the requirement must be met prior to the preliminary examination.

Ancient History. For courses in ancient history which may be taken for credit in either history or classical studies, see Classical Studies.

For Seniors and Graduates

Students may receive credit for either semester of a hyphenated course at the 200 level without taking the other semester if they obtain written consent from the instructor.

201S. The Russian Intelligentsia and the Origins of the Revolution. Origin and dynamics of the Russian revolutionary movement, the intelligentsia, and the emergence of the labor movement. 3 units. *M. Miller*

202S. The Russian Revolution. An analysis of the Bolshevik seizure of power in 1917 and the establishment of a revolutionary society and state during the 1920s. 3 units. *M. Miller*

203. Topics in Modern World Environmental History. Human effects upon the natural environment; case studies and a synthetic global perspective. 3 units. *Richards*

206. Origins of Afro-America. A comparative and interdisciplinary approach to early history of Africans in the Western hemisphere. Uses anthropological, linguistic, and archeological literature in addition to historical studies to examine the origins of the diverse African-American cultures of the Americas. 3 units. *J. Scott*

207S. Geographic Perspectives in History I: Western Europe and the Americas. Connections between history and geography. Regional, spatial, and environmental analyses of social development in Western Europe and the Americas. 3 units. *Wigen*

208S. Geographic Perspectives in History II: Asian and Pacific Worlds. Connections between history and geography. Regional, spatial, and environmental analyses of social development in Asia and the Pacific region. 3 units. *Wigen*

209S. Race, Class, and Gender in Modern British History. The intersection between gender, race, and class identities in British history since the eighteenth century. The parallels and overlaps as well as the disjunctures and distinctions between these different modes of power in a period of tremendous economic, social, and political change resulting from industrialization and imperial expansion. Questions and issues include the impact of industrialization on gender as well as class consciousness, the role of women, the middle classes and the working classes in the campaign against slavery, British workers' reactions to the "scramble" for colonies, the attitudes and activities of British women in the empire, and sexuality and the evolution of racist discourse. 3 units. *Thorne*

210S. Anthropology and History. Prerequisite: major in history, one of the social sciences, or comparative area studies; or graduate standing. See C-L: Cultural Anthropology 207S. 3 units. *Reddy*

211A. History of Medicine in the Southern United States. The social history of disease and medical practice in the southern United States from the colonial era to World War II. Topics will include the impact of disease on the region's settlement and economy, slave health, the role of "alternate practitioners," and the growing federal presence in the post-Reconstruction South. 3 units. *Humphreys*

214. Class, Public Opinion, and the French Revolution. The current state of the ongoing controversies over the origins and character of the first modern social revolution. 3 units. *Reddy*

216S. United States Diplomacy, 1890-1945. 3 units. *Davis*

217. Problems in American Colonial History. 3 units. *J. Scott*

219S, 220S. History of Science and Technology. The interaction of science and technology in the Western world from earliest times to the present. 3 units each. *Mauskopf and Roland*

221. Topics in the Social and Economic History of Europe, 1200-1700. C-L: Medieval and Renaissance Studies. 3 units. *Staff*

222. Problems in the Intellectual History of the European Renaissance and Reformation. Prerequisites: History 151A, 151B and reading knowledge of German, French, or Italian. C-L: Medieval and Renaissance Studies. 3 units. *Witt*

223S, 224S. The World Wars. The causes, course, and consequences of World Wars I and II, from military, political, and economic perspectives; the legacy of World War II; special emphasis on understanding the experience of total war—not only for the individual soldier but for whole societies. 3 units each. *Biddle*

225S. Problems in Comparative Labor History. Common dilemmas and varying solutions in the cross-national development of labor-management relations, their political implications, and their larger historical significance. 3 units. *French, Gordon, or Keyssar*

226. Topics in the Labor History of the United States. 3 units. *Keyssar*

230S. Populism in Latin America. An examination of the various theoretical frameworks developed for Latin American populism, followed by case studies focusing on issues such as the emergence of a modernizing state, the role of the masses in populist movements, and the class content and ideological and cultural parameters of such movements. 3 units. *James*

231S. Readings in Latin American Colonial History. 3 units. *TePaske*

233S. Slave Resistance and Social Control in New World Societies. The operation of slave societies in the Americas from the sixteenth to the nineteenth centuries focusing on master-slave relations and slave resistance. 3 units. *Gaspar*

234S. Political Economy of Development: Theories of Change in the Third World. See C-L: Political Science 234S; also C-L: Cultural Anthropology 234S and Sociology 234S. 3 units. *Staff*

235S. The Antebellum South. The economic, political, and social aspects of life in the South, 1820-1860. 3 units. *S. Nathans*

237S. Europe in the Early Middle Ages. C-L: Medieval and Renaissance Studies. 3 units. *Staff*

238S. Europe in the High Middle Ages. C-L: Medieval and Renaissance Studies. 3 units. *Staff*

239S. History of Socialism and Communism. Problems in the origins and development of socialist and communist movements. 3 units. *Lerner*

241S-242S. United States' Constitutional History. 241S: to 1865; 242S: 1865 to present. 6 units. *Cahow*

243-244. Marxism and History. Critical examination of Marxist theory and its relevance to historical understanding and explanation. 6 units. *Dirlik*

245, 246. Social and Intellectual History of China. 3 units each. *Dirlik*

248. History of Modern India and Pakistan, 1857 to the Present. 3 units. *Richards*

251A. Topics in Intellectual History of Europe, 1250-1450. C-L: Medieval and Renaissance Studies. 3 units. *Witt*

251B. Topics in Intellectual History of Europe, 1450-1650. C-L: Medieval and Renaissance Studies. 3 units. *Witt*

252. Construction of China in European and American Literature. An examination, starting with Marco Polo's account of China, of representations of China in Euro-American writing toward an understanding of a Euro-American discourse on China. Emphasis on fiction, but consideration as well of the relationship between fictional and nonfictional writing (especially history, geography, and travelogue). While the approach is historical, contemporary representations of China are of primary concern. 3 units. *Dirlik*

253S, 254S. European Diplomatic History, 1871-1945. Origins of the First and Second World Wars, the diplomacy of the wars, and the peace settlements which followed them. 253S: 1871-1918; 254S: 1919-1945. 3 units each. *W. Scott*

256. Modern Literature and History. See C-L: French 256. 3 units. *Orr*

257. Comparative Latin America Labor. An interdisciplinary examination of the monographic literature on Latin-American labor in the twentieth century. 3 units. *French*

258S. Social Conflict in Weimar and Nazi Germany. The interactions between emancipation and backlash; military defeat and patriotism; political equality and biopolitics; dissent and repression; and among propaganda, bureaucratic chaos, and police terror. 3 units. *Koonz*

259. Archaic Greece. See C-L: Classical Studies 221. 3 units. *Oates or Rigsby*

260. Fifth and Fourth Century Greece. See C-L: Classical Studies 222. 3 units. *Oates or Rigsby*

262. Problems in Soviet History. Studies in the background of the Revolution of 1917 and the history and politics of the Soviet state. 3 units. *Lerner*

263. The Roman Republic. See C-L: Classical Studies 224. 3 units. *Boatwright or Rigsby*

265S. Problems in Modern Latin American History. 3 units. *Staff*

267S. England in the Sixteenth Century. C-L: Medieval and Renaissance Studies. 3 units. *Herrup*

268S. England in the Seventeenth Century. C-L: Medieval and Renaissance Studies. 3 units. *Herrup*

271S. The Law of War. The evolution of constraints on warfare in the Western world, both codified and customary. The concept of the "just war" as well as restrictions on the

conduct of combat (ground, naval, and aerial) as they have evolved over time. 3 units. *Biddle*

272S. *Fin-de-siècle* and Interwar Vienna: Politics, Society, and Culture. Advanced undergraduate seminar in intellectual history focusing on the cultural milieu of *fin-de-siècle* and interwar Vienna. 3 units. *Hacohen*

273S, 274S. Topics in the History of Science. Critical stages in the evolution of scientific thought. 3 units each. *Mauskopf*

275S. Asian and Asian-American Women in Comparative Perspective. A woman-centered approach to the history of colonialism and nationalist struggles in Asia, the evolution of racist discourse and its impact on Asian immigration to the United States. 3 units. *Mazumdar*

277S. The Coming of the Civil War in the United States, 1820-1861. 3 units. *Durden*

278S. The Civil War in the United States and Its Aftermath, 1861-1900. 3 units. *Durden*

279, 280. Health, Healing, and History. The development of medicine within the broader cultural context from prehistory to the twentieth century. 3 units each. *English*

281S. United States' Diplomacy since 1945. 3 units. *Davis*

282S. Canada. A research seminar for advanced students familiar with Canada. Topics vary each semester; recent perspectives have included nationalism, Canadian-American relations, regionalism in the Maritimes and the West, and cross-border environmental issues, among others. C-L: Cultural Anthropology 282S, Economics 282S, Political Science 282S, and Sociology 282S. 3 units. *Staff*

285S, 286S. Oral History. Research on race relations and civil rights in the United States in the twentieth century using techniques of oral history. Consent of instructor required. 3 units each. *Chafe and Goodwyn*

287S. History and Social Theory. Contemporary theories of social order, social change, and revolution. 3 units. *Goodwyn*

288S. Germany and Japan in World War II. A comparative inquiry into the experience of these two capitalist "late developing" nations that turned to fascism and militarism in the 1930s. Topics include business and the state in wartime mobilization, wartime labor and productivity, the experience of women at work and at home, impact of firebombings, wartime propaganda and racism, postwar memory of the wartime era. 3 units. *Gordon and Koonz*

289S. War, Revolution, and Society in the Caribbean 1700-1815. Explores the complex impact of European imperialism and the American, French, and Haitian revolutions upon Caribbean societies to the end of the Napoleonic wars. Military, economic, social, political, and institutional theories examined. 3 units. *Gaspar*

291S. Modern Jewish Politics. The development of the main currents in modern Jewish politics—nationalism, integrationism, and orthodoxy. Emphasis on the activities of these political movements in Europe and in the United States in the twentieth century. The influence of these movements on Israel. 3 units. *Mendelsohn*

Required Courses for Graduates

301-302. Research Seminar in History. This seminar is required of all entering first-year doctoral candidates in history. 6 units. *Staff*

312. Seminar in the Teaching of History in College. This course is intended to acquaint students with the problems involved in teaching history in college. Required of all candidates for the degree of Doctor of Philosophy who are in residence for two years at Duke. As an alternate method of meeting this requirement, a graduate student may, in cooperation with a member of the faculty, serve a one-semester teaching apprenticeship. Supervised by director of graduate studies. No credit.

314. Historical and Social Science Methodology. Methods used in historical research with emphasis upon the various social science approaches. Required of all candidates for the Ph.D. degree who are in residence for two years at Duke University. 3 units. *Staff*

Colloquia and Seminars for Graduates

305. The British Empire: Recent Interpretations. Colloquium emphasizes recent interpretations of the following topics: (1) the imperialism of free trade; (2) nineteenth-century India; (3) the new imperialism; (4) nationalism and decolonization (India and Africa); (5) Empire to Commonwealth; (6) imperialism and gender. 3 units. *Staff*

309S, 310S. Seminar in Afro-American History, 1900 to the Present. Historiography and research on the black experience and race relations in the age of segregation, during the Civil Rights Movement, and in the post-civil rights era. 3 units each. *Gavins*

315. Topics in British History. 3 units. *Thorne*

320S. The Working Class in the United States. 3 units. *Keyssar*

325S. Topics in Modern American Political and Social History. 3 units. *Keyssar*

326S. Introduction to Military History. Critical reading and discussion of classic works and studies representative of the major genres in the field. 3 units. *Biddle and Roland*

328S. War and Society in Early Modern Europe. A study of the relationship between war, state formation, economic developments, social structures, gender relations, and art and literature between 1500 and 1789. C-L: Medieval and Renaissance Studies. 3 units. *Neuschel*

330S. Selected Topics in Brazilian History. 3 units. *French*

335S. Comparative Labor History. Selected topics and methodological and historiographical controversies in the labor history of two or more world regions. 3 units. *Fink and French*

340S. Topics in Modern Latin American Social and Political History. Empirical case studies and methodological and historiographical themes in nineteenth- and twentieth-century Latin America. 3 units. *James*

351-352. Colloquia. Each colloquium deals with an aspect of history by means of readings, oral and written reports, and discussion, with attention to bibliography. *Ad hoc* colloquia may be worked out during registration in the various fields represented by members of the graduate faculty; these colloquia do not appear on the official schedule of courses. In some instances, students may take the equivalent of a research seminar in conjunction with the colloquium and will be credited with an additional 6 units by registering for 371.1-372.1, etc. C-L: Women's Studies. Variable credit.

371-372. Research Seminars. To be taken either in conjunction with colloquia listed above or by special arrangement with appropriate graduate instructors when research seminars in a desired area are not offered. These seminars do not appear on the official schedule of courses. 6 units. *Staff*

389. Seminar in Conservation and Environmental History. Traces the evolution of conservation and environmental movements and the development of environmental ethics. History of agencies, industries, associations, and citizen groups as well as overall policies for land and resources. Comparison of parallel developments in Canada. Consent of instructor required. C-L: Environment 389. 3 units. *Steen*

Independent Study

399. Special Readings. Supervised independent study and reading. Consent of instructor required. 3 units. *Staff*

N.B. For the most current listing of scheduled courses, please refer to the most recent Duke University official schedule of courses printed twice a year.

COURSES CURRENTLY UNSCHEDULED

204. German Society, 1914-1945

205S. Gender and War

212. The American Indian in the Revolutionary Era, 1760-1800

215S. The United States in International Relations: The Eighteenth and Nineteenth Centuries

227-228. Recent United States History: Major Political and Social Movements

247. History of Modern India and Pakistan, 1707-1857

249-250. Social and Intellectual History of the United States

261. Alexander and the Hellenistic World

264. The Roman Empire

266. Late Antiquity

269S-270S. British History, Seventeenth Century to the Present

284S. Feminist Theory and the Social Sciences

The Master of Arts Program in Humanities

Professor A. Leigh DeNeef, *Director* (English)

The Master of Arts Program in Humanities is an interdepartmental program and is tailored to the needs of individual students. The candidate defines a theme and selects appropriate course work with the aid and approval of a supervising committee. Thirty units of course work and proficiency in a foreign language are required for completion of the program. The degree may be earned with or without a thesis. The candidate who chooses not to submit a thesis will submit instead at least two substantial papers arising from course work for review by committee members, and meets with them to discuss his or her program in a final master's colloquium.

The program is open to holders of undergraduate degrees in any discipline who can demonstrate sufficient background in humanities to permit study at the graduate level. Admission is by regular application to the Graduate School. Students may enroll full time or part time (minimum of 3 units per term). Students considering entering the program may enroll in an appropriate graduate course or courses through the Office of Continuing Education, at the same time making their interest known to the director of the Humanities Program.

Immunology

Professor Tedder, *Chair* (353 Jones); Professor Dawson, *Interim Director of Graduate Studies* (317 Jones); Professors Buckley, Haynes, McClay, Rosse, and Ward; Associate Professors Corley and Krangel; Assistant Professors Argon, Doyle, Markert, and Pisetsky; Research Associate Professor Balber; Professors Emeriti Amos and Metzgar

The department offers graduate work leading to the Ph.D. degree. Research programs are available in various aspects of molecular and cellular immunology, including immunochemistry and immunogenetics. The department is also a participating member in the interdisciplinary University Programs in Cell and Molecular Biology and Genetics, and the Medical Scientist Training Program.

The department has excellent facilities for carrying out all aspects of immunologic, cell biologic, and genetic research. A brochure describing the Ph.D. program, prerequisites for admission, and research in the department may be obtained by writing to the Director of Graduate Studies, Department of Immunology, Box 3010, Duke University Medical Center, Durham, NC 27710.

214. Fundamentals of Electron Microscopy. See C-L: Microbiology 214. 3 units. *Miller*

219. Molecular and Cellular Bases of Differentiation. See C-L: Cell Biology 219; also C-L: Biochemistry 219, Microbiology 219, and Pathology 219. 3 units. *Counce and staff*

244. Principles of Immunology. An introduction to the molecular and cellular basis of the immune response. Topics include anatomy of the lymphoid system, lymphocyte biology, antigen-antibody interactions, humoral and cellular effector mechanisms, and control of immune responses. Prerequisites: Biology 160 and Chemistry 151L or equivalents. C-L: Zoology 244. 3 units. *Kostyu (immunology), McClay, and staff*

246S. Parasitic Diseases. Topics in the physiology and immunology of major human and animal parasites with an emphasis on protozoa and schistosomes. Extensive reading in and discussion of current literature. Basic parasitology developed in introductory readings and lectures. Prerequisites: Biochemistry 227 or equivalent; and Immunology 244 or Immunology/Microbiology 291. C-L: Microbiology 246S. 3 units. *Balber*

252. General Virology and Viral Oncology. See C-L: Microbiology 252. 4 units. *Keene and staff*

259. Molecular Biology I: Proteins and Enzymes. Prerequisite: introductory biochemistry or consent of instructor. See C-L: Cell and Molecular Biology 259; also C-L: Biochemistry 259, Cell Biology 259, and Microbiology 259. 3 units. *Richardson and staff*

268. Molecular Biology II: Nucleic Acids. Prerequisites: introductory biochemistry and BCH/CMB/CBI/IMM/MIC 259, or consent of instructor. See C-L: Cell and Molecular Biology 268; also C-L: Biochemistry 268, Cell Biology 268, Microbiology 268, and The University Program in Genetics. 4 units. *Steege and staff*

269. Advanced Cell Biology. Prerequisite: introductory cell biology or consent of instructor. See C-L: Cell and Molecular Biology 269; also C-L: Botany 269, Cell Biology 269, Microbiology 269, and Zoology 269. 3 units. *Siedow and staff*

291. Comprehensive Immunology. An intensive course in the biology of the immune system and the structure and function of its component parts. Major topics discussed are: properties of antigens; specificity of antibody molecules and their biologic functions; cells and organs of the lymphoid system; structure and function of comple-

ment; inflammation and non-specific effector mechanisms; cellular interactions and soluble mediators in lymphocyte activation, replication, and differentiation; regulation of immune responses; neoplasia and the immune system; molecular structure and genetic organization of immunoglobulins, histocompatibility antigens, and T-cell receptor. Required course for all students specializing in immunology. C-L: Microbiology 291. 4 units. *Krangel and staff*

304. Molecular Membrane Biology. An advanced seminar course covering selected aspects of current research on biogenesis and dynamics of various cellular membranes. Emphasis will be on the cell biology of the immune system. Discussion topics will represent the following areas: biosynthesis of membrane proteins; intracellular transport vesicles; endocytosis; signal transduction across the plasma membrane; intracellular organelles and protein sorting; cell interactions in differentiation. Prerequisite: Microbiology 269 or consent of instructor. C-L: Microbiology 304. 2 units. *Argon*

310. Molecular Development. See C-L: Microbiology 310. 2 units. *Linney*

330. Medical Immunology. A brief review of basic concepts in immunology followed by in-depth discussions of the role of immune mechanisms in the pathogenesis and treatment of human diseases. Principle emphasis on immune deficiency diseases, hypersensitivity, alloimmunity, transplantation, infectious diseases, autoimmunity, tumor immunology, and immunohematology. 5 units. *Ward and staff*

332. Immunology Seminar. Research topics in immunology with seminars presented by students, faculty, and outside speakers. Required course for all students specializing in immunology. 1 unit. *Staff*

335-336. Current Topics in Immunology. Focus on current immunology research, emphasizing emerging research areas and new directions in established areas. Students present recent papers in selected subjects. 2 units. *Corley and staff*

The Duke–University of North Carolina Program in Latin American Studies

Professor William Ascher, *Director* (2114 Campus Drive)

The Duke-UNC Program in Latin American Studies cooperates with the Council on Latin American Studies to oversee and coordinate graduate education in Latin American studies at Duke. Graduate students in Arts and Sciences as well as professional school students may concentrate their studies on Latin America. In addition to fulfilling the requirements of their departments, students of Latin American studies may undertake special courses of interdisciplinary study, or those offered by other departments, to broaden their knowledge of the region. (For additional information about the council and the graduate certificate in Latin American Studies, see the section on "Special and Cooperative Programs" in this bulletin.)

The interdisciplinary focus of the graduate program is enhanced by the numerous activities of the Duke-UNC program, which offers graduate students at Duke an array of intellectually challenging opportunities to broaden their disciplinary training. The single most important initiative of the Duke-UNC program is the sponsorship of interdisciplinary working groups that bring together faculty and graduate students from both campuses to conduct research and training in areas of central concern to Latin American studies. The objective is to move beyond the seminar format that dominates graduate education in the social sciences and humanities, and to focus instead upon training graduate students in a manner similar to the direct research collaboration that typically characterizes training in the natural sciences. The groups focus on topics such as political economy, health and the environment, culture, gender issues, religious

change and labor issues in Latin America. The program also sponsors a Graduate Student Colloquium designed to encourage interaction between the two graduate student bodies and administers a competition for graduate student travel grants each spring. These awards provide Duke students with the opportunity to deepen their disciplinary interests in the region through relatively brief periods of research in Latin America. In 1991 the Duke-UNC program was designated a National Resource Center for Latin American Studies by the U.S. Department of Education. This honor is accompanied by funding for a number of new activities as well as Foreign Language and Area Studies (FLAS) Fellowships for graduate students.

Further information on the activities of the program and special opportunities for graduate students may be obtained from the Duke Program Coordinator, Duke-UNC Program in Latin American Studies, 2114 Campus Drive, Box 90254, Duke University, Durham, NC 27708-0254.

200S. Seminar in Latin American Studies. Interdisciplinary study of geographical, historical, economic, governmental, political, and cultural aspects of modern Latin America and the current issues facing the region. Specific topics will vary from year to year. For juniors, seniors, and graduate students. 3 units. *Staff*

Courses with Latin American Content Offered by Departments

- Art 257S. Topics in Pre-Columbian Art and Culture. *Reents-Budet*
- Economics 219S. Economic Problems of Underdeveloped Areas. *Kelley or Wallace*
- Education 210S. Higher Education in Latin America. *DiBona*
- Environment 217. Tropical Ecology. *Terborgh*
- Environment 221. Soil Resources. *Richter*
- Environment 277. Conservation and Sustainable Development I: Concepts and Methods. *Staff*
- Environment 278. Conservation and Sustainable Development II: Integrated Problem-Solving.

Staff

- Environment 285. Land Use Principles and Policy. *Healy*
- History 207S. Geographical Perspectives in History I: Western Europe and the Americas. *Wigen*
- History 230. Populism in Latin America. *James*
- History 231S. Readings in Latin American Colonial History. *TePaske*
- History 233. Slave Resistance and Social Control in New World Societies. *Gaspar*
- History 257. Comparative Latin American Labor. *French*
- History 265S. Problems in Modern Latin American History. *Staff*
- History 351. Colloquium on Latin American Colonial History. *TePaske*
- Literature 292. Topics in Non-Western Literature and Culture. *Mudimbe or Pérez-Firmat*
- Literature 302. Seminar in Emergent Literatures. *Dorfman*
- Political Science 234S. Political Economy of Development: Theories of Change in the Third World.

Staff

- Political Science 253S. Comparative Government and the Study of Latin America. *Archer*
- Political Science 381. Research Seminar in Latin American Government and Politics. *Staff*
- Portuguese 200S. Seminar in Luso-Brazilian Literature: Africa and the African Diaspora in

Portuguese. *Anderson*

- Public Policy Studies 264S. Natural Resources and Sustainable Development. *Miranda*
- Public Policy Studies 267S. Policy-Making in International Organizations. *Ascher*
- Public Policy Studies 284S. Public Policy Process in Developing Countries. *Ascher*
- Public Policy Studies 286S. Economic Policy-Making in Developing Countries. *Conrad or*

Ramachandran

- Public Policy Studies 325S, 326S. Program in International Development Policy Sector Seminar.

Staff

- Public Policy Studies 327, 328. Program in International Development Policy Issues Seminar. *Staff*
- Religion 263. Third World Theology. *Staff*
- Sociology 222D. Proseminar in Comparative Historical Sociology: Theories of Change in Third

World. *Staff*

- Spanish 245. Modern Spanish-American Poetry. *Staff*
- Spanish 248. Studies in Spanish-American Literature. *Staff*
- Spanish 341. Colonial Prose of Spanish America. *Ross*
- Spanish 342. Colonial Poetry and Theater of Spanish America. *Ross*
- Spanish 346. Modern Spanish-American Fiction. *Pérez-Firmat*
- Spanish 391, 392. Hispanic Seminar. *Staff*

The Master of Arts in Liberal Studies Program

Diane Sasson, Ph.D., *Director*

This interdisciplinary program allows individuals with a variety of professional and personal educational interests the flexibility to pursue their goals across traditional disciplinary boundaries. The program is managed by an interdepartmental committee which admits students, selects courses, and determines policy. Students study primarily on a part-time basis and choose from an array of interdisciplinary courses developed specifically for this program. In addition to the special liberal studies courses, students may select courses from other departments in the Graduate School.

The MALS program consists of nine courses and a final project. These courses are offered during three academic terms (fall, spring, and summer) and may be taken either on a full-time or part-time basis. For more information on specific courses and other program requirements, a separate bulletin on the Master of Arts in Liberal Studies may be requested from the program director (Box 90095, Duke University, Durham, North Carolina 27708).

The Program in Literature

Professor Jameson, *Chair* (Graduate Program in Literature and French); Professor Moi, *Director of Graduate Studies* (Graduate Program in Literature and French); Professors Fish (English and law), Lentricchia (Graduate Program in Literature and English), Mignolo (Spanish and Graduate Program in Literature); Mudimbe (Graduate Program in Literature, French, and cultural anthropology), Radway (Graduate Program in Literature), Rolleston (Germanic languages and literature), Schor (French and Graduate Program in Literature), B. H. Smith (Graduate Program in Literature and English), Stewart (French), Surin (Graduate Program in Literature and religion), Thomas (French and Graduate Program in Literature), and Tompkins (English); Associate Professors Gaines (Graduate Program in Literature and English), and Kaplan (French and Graduate Program in Literature); Research Professor Dorfman (Graduate Program in Literature and Latin American studies)

The interdepartmental program leading to a Ph.D. in literature offers to qualified students the opportunity to develop individual courses of study with a strong emphasis on interdisciplinary work, literary theory, and cultural studies, while at the same time building strength in one or more of the national literatures. The program offers both introductory courses (the 250 series) and more specialized seminars (the 280 series), as well as tutorials (300) in specific research projects or problems.

For tutorials, advising, and dissertation supervision the program draws also on the expertise of other faculty such as Professor C. Davidson (English), Associate Professor Wharton (art); Professor Newton and Associate Professor Burian (classical studies); Professors Ryals, Sedgwick, and Torgovnick (English); Professor Tetel and Associate Professor Orr (French); Professor Borchardt (German); and Professor Lahusen (Slavic). Students entering the program must present evidence of ability to read one language other than English, and must acquire reading competence in a second language before taking their preliminary examinations.

More information on the program and a full descriptive brochure is available from Professor Moi, Director of Graduate Studies, Art Museum 104, Duke University, Durham, North Carolina 27708-0670.

211. Theory and Practice of Literary Translation. Linguistic foundations and historical role of translation. Practical exercises and translation assignments. Prerequisites: working knowledge of a foreign language and consent of instructor. 3 units. *Burian*

212. Studies in Narrative. Topics to vary. 3 units. *Staff*

251. History of Criticism. A historical survey of critical and philosophical concepts affecting the definition and evaluation of literature from Plato through the nineteenth century. 3 units. *Jameson, Lentricchia, or Stewart*

252. Criticism and Literary Theory in the Twentieth Century. Introduction to critical movements, philosophies, and strategies forming contemporary theories of literature: deconstruction, feminism, formalism, Marxism, New Criticism, phenomenology, psychoanalysis, structuralism. May be repeated for credit according to change of content or instructor. 3 units. *Jameson or Rolleston, with guest lecturers*

253. Philology, Linguistics, and the Roots of Literature. A survey of the various ways in which language and literature interact, with an introduction to philology and historical linguistics. 3 units. *Andrews (Slavic) or Thomas*

254. Introduction to Feminism. Major trends and tendencies of feminist theory and its history. Perspectives are both international as well as Third World and interdisciplinary. Various feminist methodologies as well as crucial polemics. 3 units. *Moi, Radway, or Schor*

(The 280-290 series implies prior knowledge of literary theory, past and present; these courses are open to graduate students and qualified seniors only.)

280. Semiotics for Literature. See C-L: French 223. 3 units. *Thomas*

281. Paradigms of Modern Thought. Specialized study of the work of individual thinkers who have modified our conceptions of human reality and social and cultural history, with special emphasis on the form and linguistic structures of their texts considered as "language experiments." Topics will vary from year to year, including: Marx and Freud; J.-P. Sartre; Walter Benjamin; etc. 3 units. *Jameson, Moi, Mudimbe, or Surin*

282. Contemporary Literary Theory. Specialized studies in literary theory from Saussurean linguistics to the present day (e.g., deconstruction, feminism, new historicism, neopragmatism, reception theory). 3 units. *Fish, Jameson, Lentricchia, or Tompkins*

283. Modernism. Aspects of the "modern," sometimes with emphasis on the formal analysis of specific literary and nonliterary texts (Joyce, Kafka, Mahler, Eisenstein); sometimes with a focus on theories of modernism (Adorno), or on the modernism/postmodernism debate, or on the sociological and technological dimensions of the modern in its relations to modernization, etc. 3 units. *Jameson or Lentricchia*

284. The Intellectual as Writer. History and theory of the literary role of the intellectual in society (e.g., in Augustan Rome, the late middle ages, the Renaissance, America, Latin America). 3 units. *Jameson, Lentricchia, Moi, or Mudimbe*

285. Literature and Ideology. The theoretical problem of the relationship between literature and ideology, explored through the cultural history of genres, major writers, or aesthetic movements. 3 units. *Jameson, Lentricchia, or Mudimbe*

286. Topics in Legal Theory. A consideration of those points at which literary and legal theory intersect (e.g., matters of intention, the sources of authority, the emergence of professional obligation). 3 units. *Fish*

287. Problems in Narrative Analysis. An introduction to contemporary theories and methods of narrative analysis (Greimas, Barthes, Hayden White, etc.), with emphasis on a specific area (e.g., historiography, film, sub-genres of the novel, myth, cognitive discourse). 3 units. *Jameson, Mudimbe, or Radway*

288. Basic Issues in the History of Literary Theory. Issues include attempts to define literature, divergent views of its social functions and psychological effects, and contem-

porary controversies regarding literary meaning and interpretation. Readings range from classic texts in philosophy of art to contemporary essays in critical theory. 3 units. *B. H. Smith or Stewart*

289. Topics in Feminist Theory. 3 units. *Moi, Radway, Schor, or Tompkins*

290. Topics in Psychoanalytic Criticism. 3 units. *Moi*

291. Topics in Popular Culture and the Media. 3 units. *Radway, Tompkins, or Willis*

292. Topics in Non-Western Literature and Culture. 3 units. *Mudimbe*

293. Seminars in Literature and History. Relationship of literary texts to varieties of historical experience such as wars, periods of revolutionary upheaval, periods of intense economic growth, "times of troubles," or stagnation. Literary texts and historical content posed in such formal ways as the theoretical problem of the relationship between literary expression and form and a range of historical forces and phenomena. 3 units. *Jameson, Kaplan, Orr, or Schor*

294. Theories of the Image. Different methodological approaches to theories of the image (film, photography, painting, etc.), readings on a current issue or concept within the field of the image. Examples of approaches and topics are feminism, psychoanalysis, postmodernism, technology, spectatorship, national identity, authorship, genre, economics, and the ontology of sound. 3 units. *C. Davidson, Gaines, or Jameson*

295. Representation in a Global Perspective. Problems of representation approached in ways that cross and question the conventional boundaries between First and Third World. Interdisciplinary format, open to exploration of historical, philosophical, archeological, and anthropological texts as well as literary and visual forms of representation. 3 units. *Dorfman, Jameson, or Mignolo*

296. Feminist Thought Before 1970. Feminist thought developed before the emergence of the new women's movement; the historical and philosophical issues at stake in the feminist tradition. 3 units. *Moi*

297. Topics in Cultural Studies. 3 units. *Gaines, Radway, Surin, and staff*

298. Topics in Philosophy and Literature. Exploration of problems common to literary theory and philosophy. Examples of topics include: problems of identity, consciousness, foundationalism, interpretation, or ethics, or schools of thought such as pragmatism, phenomenology, and existentialism. 3 units. *Flanagan, Jameson, Mudimbe, and Surin*

299. Universalism in Twentieth-Century Thought. The Enlightenment tradition and its critical reception in the twentieth century. Readings range from classic Enlightenment texts to contemporary texts. 3 units. *Schor*

300. Problems in the Theory of Value and Judgment. An advanced seminar dealing with classic problems relating to the concept of value and evaluative behavior (e.g., standards, judgments, canon-formation, taste), as illuminated by contemporary work in critical theory, anthropology, economics, sociology, etc. C-L: English 386 and Philosophy 300. 3 units. *B. H. Smith*

301. Language and Theory in the Twentieth Century. A seminar examining some of the most significant analyses, controversies, and achievements of the various disciplinary approaches to language during the past century and their implications for cultural study. Topics include the question of linguistics as a science, the muddle of meaning and interpretation, approaches to communication as social interaction, the Chomskian episode, and poststructural/postanalytic conceptions and contributions. 3 units. *Fish, B. H. Smith, and J. Tetel*

302. Seminar in Emergent Literatures. An advanced seminar in the literature of Third World or nonwestern countries. Specific topics vary from year to year. 3 units. *Dorfman*

303. Topics in Criticism and Aesthetics. Selected readings in traditional and contemporary criticism, philosophical aesthetics, and literary theory. 3 units. *Visiting faculty or staff*

391. Tutorial in Special Topics. Directed research and writing in areas unrepresented by regular course offerings. Consent of instructor required. 3 units. *Staff*

399. Special Readings. Consent of instructor required. Variable credit. *Staff*

The University Program in Marine Sciences

Professor Ramus (botany and environment), *Director*; Associate Professor Rittschof (zoology and environment), *Director of Graduate Studies*; Professors Barber (botany, environment, geology, and zoology), C. Bonaventura (cell biology and environment), J. Bonaventura (cell biology and environment), Forward (zoology and environment), Gutknecht (cell biology and environment), Pilkey* (geology), and Searles† (botany; Assistant Professors Howd (environment and geology) and Lozier (environment, geology, and mechanical engineering and materials science); Professor Emeritus Bookhout (zoology); Professor of the Practice Orbach (environment); Associate Professor of the Practice Kirby-Smith (environment)

Graduate students from any and all academic disciplines are encouraged to take training at the Marine Laboratory. The program operates year-round, providing course work in the marine sciences, an active seminar program, and facilities supporting dissertation research. Resident graduate students represent the Departments of Botany, Cell Biology, Environment, Geology, and Zoology. Ordinarily, dissertation advisors are resident as well, although this need not be the case. The Marine Laboratory has available graduate student instructional assistantships and fellowships during the academic year, including summer. In addition, tuition credits obtained from fellowship support may be applied to courses given both at the Marine Laboratory and the Durham campus.

Persons interested in graduate work in the marine sciences should apply through one of the appropriate departments (botany, cell biology, environment, geology, or zoology). The application form for enrollment in a graduate degree program may be obtained from the Graduate School. Graduate students planning to enroll in academic course work at the Marine Laboratory during the fall or spring semester should notify the Admissions Office of the Marine Laboratory of such intent at the time of preregistration for the respective semester and must register as normally prescribed. Students planning to enroll in academic course work or graded graduate research at the Marine Laboratory during the summer must submit the appropriate application form to the Admissions Office, Duke University, School of the Environment, Marine Laboratory, Beaufort, North Carolina 28516-9721. The application form for enrollment in summer courses is found in the publication *Marine Laboratory 1994*. Students registering for graded research in the fall, spring, or summer should do so under the appropriate departmental numbers.

The following courses are offered at Beaufort. See the publication *Marine Laboratory 1994* for the current schedule of courses.

*Spring only.

†Summer only.

FALL, SPRING, OR SUMMER PROGRAM AT BEAUFORT

For Juniors, Seniors, and Graduates

Botany 218L. Barrier Island Ecology. An integration of barrier island plant and animal ecology within the context of geomorphological change and human disturbance. Topics include: barrier island formation and migration, plant and animal adaptations, species interactions, dune succession, maritime forests, salt marshes, sea level rise, conservation policy, and restoration ecology. Field trips to many of the major North Carolina barrier islands. Emphasis on field observation and independent research. Given at Beaufort. Prerequisite: introductory biology; suggested: course in botany or ecology. C-L: Environment 218L. 6 units. *Evans, Peterson, and Wells (visiting summer faculty)*

Botany 359, 360. Research. Individual investigation in the various fields of botany. Credit to be arranged. *All members of the Graduate School staff*

Cell Biology 210. Individual Study. Directed reading and research in cell biology/physiology. Prerequisite: consent of director of graduate studies. Credit to be arranged. *Staff*

Cell Biology 235, 235L. Advanced Research Training in Marine Molecular Biology and Biotechnology. Modern molecular biology is taught in lectures and laboratory exercises using fish, molluscs, algae, and marine forms. Topics and techniques include DNA, RNA, and protein assays; isolation; genomic library screening, and bacteriological and cell culture techniques. Given at Beaufort. C-L: Environment 254, 254L. 4 units; 6 units with laboratory. *Staff*

Cell Biology 270S. Molecular and Cellular Adaptations of Marine Organisms. Marine organisms meet the challenge of living in a hostile and ever-changing environment by numerous adaptive mechanisms. This seminar focuses on the underlying cellular and molecular processes. Topics explored in regard to adaptive processes in marine organisms include changes in metabolism, respiration, and vision. The impact of environmental pollutants and human health significance will also be addressed. C-L: Environment 224S. 2 units. *C. Bonaventura*

Environment 222S. Coastal Processes. Waves and currents in the nearshore zone and their role in beach evolution. Linear wave theory and models for beach evolution. Other topics include nearshore currents, tides, estuarine circulation, and field techniques for measurement of nearshore morphology and fluid motions. Term paper required. Prerequisite: introductory calculus. C-L: Geology 201S. 2 units. *Howd*

Environment 223L. Behavioral Ecology. How ecological factors shape foraging, mating, aggressive, and social behavior. Laboratory experiments and field observations from the Outer Banks environment. Independent projects and seminars. (Not open to undergraduates.) Prerequisite: introductory biology. 4 units. *Rubenstein (visiting summer faculty)*

Environment 225L. Coastal Ecotoxicology and Pollution. Principles of transport, fates, food-web dynamics and biological effects of pollutants in the marine environment. Laboratory to stress standard techniques for assessing pollutant levels and effects. Prerequisites: introductory chemistry and biology. (Given at Beaufort.) 4 units. *Staff*

Environment 226L. Marine Mammals. Ecology, social organization, behavior, acoustic communication, and management issues. Focused on marine mammals in the Southeastern United States (for example, bottlenose dolphin, right whale, West Indian manatee). Laboratory exercises will consider social organization and acoustic communication in the local bottlenose dolphin population. (Given at Beaufort.) Suggested prerequisite: introductory biology. 2 units. *Forward and staff*

Environment 228L. Physiology of Marine Animals. Environmental factors, biological rhythms, and behavioral adaptations in the comparative physiology of marine animals. Not open to undergraduates. (Given at Beaufort.) Prerequisites: introductory biology and chemistry. 4 units (fall); 6 units (summer). *Forward*

Environment 229L. Biochemistry of Marine Animals. Functional, structural, and evolutionary relationships of biochemical processes of importance to marine organisms. (Not open to undergraduates.) Prerequisites: introductory biology and inorganic chemistry. 4 units. *Rittschof*

Environment 243. Environmental Biochemistry. Introduction to the (macro)molecules of life and fundamental metabolic pathways. Topics are presented in the context of environmental perturbations. Fundamental aspects of energetics, proteins, enzymes, carbohydrates, lipids and nucleic acids. Emphasis on mechanisms of adaptation, molecular controls, and responses to toxicants. Prerequisite: organic chemistry. C-L: Environment 243. 3 units. *C. Bonaventura and Brouwer*

Environment 244. Cellular and Molecular Research Techniques. Introduction to the use of electrophoresis, chromatography, enzymology, equilibrium assays, rapid reaction kinetics, microscopy, molecular graphics and various modes of spectroscopy in analyzing molecules and tissues of organisms collected from polluted and pristine environments. The applicability of techniques of modern molecular biology are discussed in relation to other research techniques used to examine fundamental molecular

mechanisms and the adverse effects of pollutants on natural processes. Prerequisite: organic chemistry. C-L: Environment 244. 3 units. C. *Bonaventura and Brouwer*

Environment 252L. Techniques in Environmental Data Analysis. Introduction to techniques commonly used by environmental scientists for the analysis of spatial and/or temporal series of data. Topics will include regression, Fourier analysis, spectral and cross-spectral analysis and empirical orthogonal functions. Emphasis on developing a hands-on understanding of the methods and correct interpretation of results. Term project required. Prerequisite: introductory calculus. C-L: Geology 222L. 4 units. *Howd*

Environment 290. Physical Oceanography. Introduction to the dynamic principles of ocean circulation with an emphasis on large temporal and spatial scales of motion. Topics to be covered include wind-driven and density-driven flow, western boundary intensification, mid-ocean, shelf and tropical circulations. Prerequisite: laboratory calculus. C-L: Geology 203 and Mechanical Engineering 290. 3 units. *Lozier*

Environment 292L. Biological Oceanography. Physical, chemical, and biological processes of the oceans, emphasizing special adaptation for life in the sea and factors controlling distribution and abundance of organisms. Laboratory emphasis. (Not open to undergraduates.) Prerequisite: introductory biology. 4 units (fall or spring); 6 units (summer). *Ramus or staff*

Environment 293. Analysis of Ocean Ecosystems. Examination of the ecosystem concept considering its history, utility, and heuristic value. Examination of ocean systems in the context of Odum's ecosystem concept. Structure and function of the earth's major ecosystems. Term paper required. (Not open to undergraduates.) Prerequisites: one year of biology and chemistry, or consent of instructor. 3 units. *Barber*

Environmental 294L. Marine Communities. Dynamics of marine communities in the context of current ecological theory. Life history strategies, competition, predation, diversity, and stability; detailed considerations of benthic and pelagic communities. (Not open to undergraduates.) Prerequisites: introductory biology and mathematics. 4 units. *Gerhart*

Environment 295L. Marine Invertebrate Zoology. Structure, function, and development of invertebrates collected from estuarine and marine habitats. Not open to students who have taken Biology or Zoology 274L. Not open to undergraduates. Prerequisite: introductory biology. 4 units (fall or spring); 6 units (summer). *Kirby-Smith*

Environment 299. Independent Studies and Projects. Directed readings or research at the graduate level to meet the needs of individual students. Consent of instructor required. Units to be arranged. *Staff*

Geology 205S. Geological Oceanography. The geology of ocean basins, including origin, bottom physiography, sediment distribution, and sedimentary processes. Not open to students who have taken Geology 206S. C-L: Environment 291S. 3 units. *Staff*

Geology 209. Climatic Change. Record of changing climate on Earth, as determined from the analysis of deep sea sediments, ice-cores, lake sediments, and tree rings. C-L: Environment 231. 4 units. *Johnson*

Geology 371, 372. Advanced Topics in Geology. To meet the individual needs of graduate students for independent study in various environmental sedimentary fields. 1 to 3 units. *Staff*

Zoology 203L. Marine Ecology. Factors that influence the distribution, abundance, and diversity of marine organisms. Course structure integrates lectures, field excursions, and independent research projects. Topics include characteristics of marine habitats, adaptation to environment, species interactions, biogeography, larval recruitment, rocky shores, marine mammals, fouling communities, tidal flats, beaches, subtidal communities, and coral reefs. Prerequisites: none; suggested—introductory ecology, invertebrate zoology, or marine botany. C-L: Environment 219L. 6 units. *Gerhart*

Zoology 274L. Biology of Marine Invertebrates. Structures, functions, and habits of invertebrate animals under natural and experimental conditions. Field trips included. Not open to students who have taken Zoology 76L or 176L. (Not open to undergraduates.) Prerequisite: introductory biology. C-L: Environment 297L. 6 units. *Dimock (visiting summer faculty)*

Zoology 353, 354. Research. To be carried on under the direction of the appropriate staff members. Hours and credit to be arranged. *Staff*

Zoology 360, 361. Tutorials. An approved academic exercise, such as writing an essay or learning a research skill, carried out under the direction of the appropriate staff members. Hours and credit to be arranged. *Staff*

Seminar. Special topics in the ocean sciences. Exploration at the advanced level of current research in the ocean sciences. Subject dependent on faculty and student interests. Botany 295S, 296S; or Zoology 295S, 296S. 2 units. *Staff*

COURSES CURRENTLY UNSCHEDULED

Botany 219L. Benthic Marine Algae

Botany 227L. Biology of Marine Macrophytes

Biochemistry 245L. Macromolecules, Ecology, and Evolution

Biochemistry 276. Comparative and Evolutionary Biochemistry

Biology 263L. Tropical Seaweeds

Mathematics

Professor Schaeffer, *Chair* (132-B Physics); Professor Hain, *Director of Graduate Studies* (135-C Physics); Professors Allard, Beale, Bryant, Harer, Lawler, Morrison, Pardon, Reed, Rose, Stern, Venakides, Warner, and Weisfeld; Associate Professors Burdick, Hodel, Kitchen, Kraines, Moore, Saper, Schoen, Scoville, Smith, Trangenstein, and Zhou; Assistant Professors Layton, Yang, and Zheng; Adjunct Professor Chandra

Graduate work in the Department of Mathematics is offered leading to the A.M. and Ph.D. degrees. Admission to these programs is based on the applicant's undergraduate academic record, level of preparation for graduate study, the Graduate Record Examination, and letters of recommendation.

All A.M. and Ph.D. candidates are required to pass a qualifying examination after completing their first year of graduate study. The A.M. degree with a major in mathematics is awarded upon completion of 30 units of graded course work and passing the qualifying examination. A thesis may be substituted for 6 units of course work only under special circumstances.

Soon after the student who is pursuing a Ph.D. degree passes the qualifying examination, the director of graduate studies appoints a committee of two graduate faculty members who determine the conditions to be met by the student before he or she takes the preliminary examination. Normally, this committee forms the nucleus of the student's advisory committee. The conditions may include a reading knowledge of one or more foreign languages appropriate to the student's intended area of specialization, an appropriate level of computer programming proficiency, or specific course work.

Candidacy for the Ph.D. is established by passing an oral preliminary examination. The preliminary examination is normally taken during the third year. The preliminary examination is conducted by a committee selected by the rules of the Graduate School and the department. The examination can, at the student's option, consist of questions based either on the student's course work at Duke or on the specific area of research plus a minor subject selected by the student.

After admission to candidacy, the Ph.D. degree is awarded on the basis of the student's scholarly ability as demonstrated by the dissertation and its defense. The dissertation is the most important requirement in the award of the Ph.D. degree.

For Seniors and Graduates

200. Introduction to Algebraic Structures I. Laws of composition, groups, rings; isomorphism theorems; axiomatic treatment of natural numbers; polynomial rings; division and Euclidean algorithms. Not open to students who have had Mathematics 121. Prerequisite: Mathematics 104 or equivalent. 3 units. *Staff*

201. Introduction to Algebraic Structures II. Vector spaces, matrices and linear transformations, fields, extensions of fields, construction of real numbers. Prerequisites: Mathematics 200, or Mathematics 121 and consent of instructor. 3 units. *Staff*

203. Basic Analysis I. Topology of \mathbb{R}^n , continuous functions, uniform convergence, compactness, infinite series, theory of differentiation, and integration. Not open to students who have had Mathematics 139. Prerequisite: Mathematics 104. 3 units. *Staff*

204. Basic Analysis II. Inverse and implicit function theorems, differential forms, integrals on surfaces, Stokes' theorem. Not open to students who have had Mathematics 140. Prerequisites: Mathematics 203, or Mathematics 139 and consent of instructor. 3 units. *Staff*

205. Topology. Elementary topology, surfaces, covering spaces, Euler characteristic, fundamental group, homology theory, exact sequences. Prerequisite: Mathematics 104. 3 units. *Staff*

206. Differential Geometry. Geometry of curves and surfaces, the Serret-Frenet frame of a space curve, the Gauss curvature, Cadazzi-Mainardi equations, the Gauss-Bonnet formula. Prerequisite: Mathematics 104. 3 units. *Staff*

221. Numerical Analysis. Prerequisites: knowledge of an algorithmic programming language, intermediate calculus including some differential equations, and Mathematics 104. See C-L: Computer Science 250; also C-L: Statistics 273. 3 units. *Gardner, Greenside, or Rose*

222. Numerical Differential Equations. Prerequisite: Computer Science 221 or 250. See C-L: Computer Science 252. 3 units. *Gardner, Greenside, or Rose*

223. Numerical Linear Algebra. Prerequisite: Computer Science 221 or 250 or equivalent. See C-L: Computer Science 254. 3 units. *Rose*

230. Mathematical Methods in Physics and Engineering I. Heat and wave equations, initial and boundary value problems, Fourier series, Fourier transforms, potential theory. Not open to students who have had Mathematics 114. Prerequisites: Mathematics 103 and 104 or equivalents. 3 units. *Staff*

231. Mathematical Methods in Physics and Engineering II. Green's functions, partial differential equations in several space dimensions. Complex variables, analytic functions, Cauchy's theorem, residues, contour integrals. Other topics may include method of characteristics, perturbation theory, calculus of variations, or stability of equilibria. Prerequisite: Mathematics 114 or 230. 3 units. *Staff*

233. Asymptotic and Perturbation Methods. Asymptotic solution of linear and nonlinear ordinary and partial differential equations. Asymptotic evaluation of integrals. Singular perturbation. Boundary layer theory. Multiple scale analysis. Prerequisite: Mathematics 114 or equivalent. 3 units. *Staff*

238, 239. Topics in Applied Mathematics. Conceptual basis of applied mathematics, combinatorics, graph theory, game theory, mathematical programming, or numerical solution of ordinary and partial differential equations. Prerequisites: Mathematics 103 and 104 or equivalents. 3 units each. *Staff*

240. Applied Stochastic Processes. An introduction to stochastic processes without measure theory. Topics selected from: Markov chains in discrete and continuous time, queueing theory, branching processes, martingales, Brownian motion, stochastic calculus. Prerequisite: Mathematics 135 or equivalent. C-L: Statistics 253. 3 units. *Staff*

241. Linear Models. Prerequisites: Mathematics 104 and Statistics 113 or 210. See C-L: Statistics 244. 3 units. *Staff*

242. Introduction to Multivariate Statistics. Prerequisite: Statistics 244 or equivalent. See C-L: Statistics 245. 3 units. *Burdick*

245. Functional Analysis for Scientific Computing. Prerequisite: Computer Science 221 or 250. See C-L: Computer Science 256. 3 units. *Rose*

260. Groups, Rings, and Fields. Groups including nilpotent and solvable groups, p -groups and Sylow theorems; rings and modules including classification of modules over a PID and applications to linear algebra; fields including extensions and Galois theory. Prerequisite: Mathematics 201 or equivalent. 3 units. *Staff*

261. Commutative Algebra. Extension and contraction of ideals, modules of fractions, primary decomposition, integral dependence, chain conditions, affine algebraic varieties, Dedekind domains, completions. Prerequisite: Mathematics 260 or equivalent. 3 units. *Staff*

271. Algebraic Topology. Fundamental group and covering spaces, homology groups of cell complexes, classification of compact surfaces, the cohomology ring and Poincaré duality for manifolds. Prerequisites: Mathematics 171S and 200 or equivalents. 3 units. *Staff*

273. Algebraic Geometry. Local theory: affine varieties, algebraic and topological theory of singularities. Global theory over the complex numbers: Riemann surfaces, Jacobians, Kähler manifolds, Hodge theory, theorems of Lefschetz and Kodaira. Prerequisite: Mathematics 261 or equivalent. 3 units. *Staff*

275. Differential Geometry. Differentiable manifolds, fiber bundles, connections, curvature, characteristic classes, Riemannian geometry including submanifolds and variations of the length integral, complex manifolds, homogeneous spaces. Prerequisite: Mathematics 204 and 260 or equivalents. 3 units. *Staff*

276. Topics in Differential Geometry. Lie groups and related topics, Hodge theory, index theory, minimal surfaces, Yang-Mills fields, exterior differential systems, several complex variables. Prerequisite: Mathematics 275 or consent of instructor. 3 units. *Staff*

277. Topics in Algebraic Geometry. Projective varieties and the theory of extremal rays, classification of surfaces and higher-dimensional varieties, variation of Hodge structure and moduli problems, schemes and arithmetic varieties, or other advanced topics. Prerequisite: Mathematics 273 or consent of instructor. 3 units. *Staff*

278, 279. Topics in Topology. Point set, algebraic, geometric, or differential topology. Consent of instructor required. 3 units each. *Staff*

281. Real Analysis I. Measures; Lebesgue integral; L^p spaces; Daniell integral, differentiation theory, product measures. Prerequisite: Mathematics 204 or equivalent. 3 units. *Staff*

282. Real Analysis II. Metric spaces, fixed point theorems, Baire category theorem, Banach spaces, fundamental theorems of functional analysis, Fourier transform. Prerequisite: Mathematics 281 or equivalent. 3 units. *Staff*

285. Complex Analysis. Complex calculus, conformal mapping, Riemann mapping theorem, Riemann surfaces. Prerequisite: Mathematics 204 or equivalent. 3 units. *Staff*

286. Topics in Complex Analysis. Geometric function theory, function algebras, several complex variables, uniformization, or analytic number theory. Prerequisite: Mathematics 285 or equivalent. 3 units. *Staff*

290. Probability. Random variables, independence, expectations, laws of large numbers, central limit theorem, Markoff chains. Prerequisite: Mathematics 281 or equivalent. C-L: Statistics 207. 3 units. *Staff*

293. Topics in Probability Theory. Brownian motion, diffusion processes, random walks, and applications to differential equations and mathematical physics. Prerequisite: Mathematics 290 or consent of instructor. C-L: Statistics 297. 3 units. *Staff*

296. Ordinary Differential Equations. Existence and uniqueness theorems for nonlinear systems, well-posedness, two-point boundary value problems, phase plane diagrams, stability, dynamical systems, and strange attractors. Prerequisites: Mathematics 104, 111 or 131, and 203 or 139. 3 units. *Staff*

297. Partial Differential Equations I. Fundamental solutions of linear partial differential equations, hyperbolic equations, characteristics, Cauchy-Kowalevski theorem, propagation of singularities. Prerequisite: Mathematics 204 or equivalent. 3 units. *Staff*

298. Partial Differential Equations II. Elliptic boundary value problems, regularity theorems, the diffusion equation, and nonlinear equations. Prerequisite: Mathematics 297 or equivalent. 3 units. *Staff*

299. Topics in Partial Differential Equations. Hyperbolic conservation laws, pseudo-differential operators, variational inequalities, theoretical continuum mechanics. Prerequisite: Mathematics 298 or equivalent. 3 units. *Staff*

378-379. Current Research in Topology. 6 units. *Staff*

388, 389. Current Research in Analysis. 3 units each. *Staff*

COURSES CURRENTLY UNSCHEDULED

234. Mathematics for Quantum Mechanics

235. Topics in Mathematical Physics

250. Introductory Mathematical Logic

251. Set Theory I

252. Set Theory II

253. Recursion Theory

258, 259. Topics in Logic

269. Topics in Algebra

280. Differential Analysis

283. Linear Operators

284. Topics in Functional Analysis

288, 289. Topics in Analysis

294. Topics in Probability Theory

295. Fourier Analysis and Distribution Theory

358-359. Current Research in Logic

368-369. Current Research in Algebra

387. Current Research in Mathematical Physics

Program in Medieval and Renaissance Studies

Professor Witt, *Chair*; Professor DeNeef, *Director of Graduate Studies* (127 Allen)

The graduate Program in Medieval and Renaissance Studies is an interdisciplinary program administered by the Duke University Center for Medieval and Renaissance Studies. In consultation with the director of graduate studies, students in the program select courses in art, history, music, philosophy, religion, language, and literature (classical studies,

English, German, and Romance languages). For descriptions of the individual courses see the listings under the specified department.

200S. Seminar in Medieval and Renaissance Studies. Topics in the historiography and interpretation of medieval and Renaissance culture. Topics will vary from year to year. 3 units. *Staff*

300. Research Colloquium in Medieval and Renaissance Studies. 3 units. *Staff*

DEPARTMENT OF ART AND ART HISTORY

- 216. The Art of the Counter-Reformation. *Rice*
- 233S. Topics in Early Christian and Byzantine Art. *Wharton*
- 236S. Topics in Romanesque and Gothic Art and Architecture. *Staff*
- 243S. Topics in Netherlandish and German Art. *Van Miegroet*
- 247S. Topics in Italian Renaissance Art. *Rice*
- 260S. Topics in Italian Baroque Art. *Rice*

DEPARTMENT OF CLASSICAL STUDIES

- 221. Medieval Latin. *Newton*
- 312. Seminar in Latin Paleography. *Newton*

DEPARTMENT OF ENGLISH

- 207A. Introduction to Old English. *Staff*
- 207B. Old English Literature. *Staff*
- 208. History of the English Language. *Butters or Tetel*
- 212. Middle English Literature: 1100 to 1500. *Staff*
- 213, 214. Chaucer. *Staff*
- 221. Renaissance Prose and Poetry: 1500 to 1660. *DeNeef, Fish, Randall, or Schwartz*
- 225. Renaissance Drama: 1500 to 1642. *Randall*
- 310. Studies in Old English Literature. *Staff*
- 312. Studies in Middle English Literature. *Staff*
- 315. Studies in Chaucer. *Fish*
- 321. Studies in Renaissance Literature. *DeNeef, Fish, Porter, Randall, or Schwartz*
- 324. Studies in Shakespeare. *Porter*
- 329. Studies in Milton. *DeNeef, Fish, or Schwartz*

DEPARTMENT OF GERMANIC LANGUAGES AND LITERATURE

- 201. Introduction to Middle High German. *Rasmussen*
- 202S. Medieval Seminar. *Rasmussen*
- 203S. Sex, Gender, and Love in Middle High German Literature. *Rasmussen*
- 210S. Renaissance and Reformation. *Borchardt*
- 260. History of the German Language. *Rasmussen*

DEPARTMENT OF HISTORY

- 221. Topics in the Social and Economic History of Europe, 1200-1700. *Staff*
- 222. Problems in the Intellectual History of the European Renaissance and Reformation. *Witt*
- 237S. Europe in the Early Middle Ages. *Staff*
- 238S. Europe in the High Middle Ages. *Staff*
- 251A. Topics in Intellectual History of Europe, 1250-1450. *Witt*
- 251B. Topics in Intellectual History of Europe, 1450-1650. *Witt*
- 267S. England in the Sixteenth Century. *Herrup*
- 268S. England in the Seventeenth Century. *Herrup*

DEPARTMENT OF MUSIC

- 211. Notation. *Williams*
- 222. Music in the Middle Ages. *Brothers*
- 223. Music in the Renaissance. *Brothers or Silbiger*
- 228-229. Collegium Musicum. *Brothers and Menker*
- 317S. Seminar in the History of Music. (Topics vary.) *Staff*

DEPARTMENT OF PHILOSOPHY

- 218S. Medieval Philosophy. *Mahoney*
- 219S. Late Medieval and Renaissance Philosophy. *Mahoney*

DEPARTMENT OF RELIGION

- 206. The Christian Mystical Tradition in the Medieval Centuries. *Keefe*
- 219. Augustine. *Clark*
- 236. Luther and the Reformation in Germany. *Steinmetz*
- 250. Women in the Medieval Church. *Keefe*
- 272. The Early Medieval Church. *Keefe*

337. Theology of St. Thomas Aquinas. *Steinmetz*
 338. Calvin and the Reformed Tradition. *Steinmetz*
 339. The Radical Reformation. *Steinmetz*

DEPARTMENT OF ROMANCE STUDIES

French

211. History of the French Language. *Thomas*
 248. French Literature of the Seventeenth Century. *Farrell*
 325. French Prose of the Sixteenth Century. *Tetel*
 326. Topics in Renaissance Poetry. *Tetel*
 391, 392. French Seminar (medieval and Renaissance topics). *Tetel and staff*

Italian

- 284, 285. Dante. *Caserta*

Spanish

210. History of the Spanish Language. *Garci-Gómez*
 341. Colonial Prose of Spanish America. *Ross*
 342. Colonial Poetry and Theater of Spanish America. *Ross*
 351. The Origin of Spanish Prose Fiction. *Staff*
 353. Cervantes. *Staff*
 358. Spanish Lyric Poetry before 1700. *Staff*
 391, 392. Hispanic Seminar (medieval and Renaissance topics). *Staff*

COURSES CURRENTLY UNSCHEDULED

- Classical Studies 327. Seminar in Byzantine History
 English 383. Studies in Textual Criticism
 French 240. Old French Literature
 German 215S. German Baroque Literature
 Music 341S. History of Music Theory to Rameau
 Music 351S. Studies in Musical Iconography
 Music 361S. Musical Organology
 Religion 241. Problems in Reformation Theology
 Religion 251. Counter-Reformation and Development of Catholic Dogma
 Religion 334. Theology and Reform in the Later Middle Ages
 Religion 344. Zwingli and the Origins of Reformed Theology

Microbiology

Professor Keene, *Acting Chair* (414A Jones); Assistant Professor Pickup, *Director of Graduate Studies* (421 Jones); Professors Bastia, Bolognesi, Endow, Joklik, and Nevins; Associate Professors Cullen, Kreuzer, Linney, Mitchell, and White; Assistant Professors Garcia-Blanco, Horowitz, Ostrowski, Seldin, and Wharton; Professors Emeriti Osterhout, Wheat, and Willett; Associate Research Professors Burdett and Miller

The Department of Microbiology offers a broadly-based graduate program leading to the Ph.D. degree. It also participates in interdepartmental programs such as the University Program in Genetics, the Program in Cell and Molecular Biology, and the Medical Scientist Training Program. The department's graduate program is designed to provide students with a strong scientific base in the principles and techniques of contemporary bacterial and animal cell biology.

The research interests of the faculty provide numerous and diverse areas for training in prokaryotic and eukaryotic molecular cell biology, molecular genetics and virology, as well as in broad multidisciplinary areas like the nature of protein nucleic acid interactions, the nature of the molecular controls of gene expression, molecular virology, and the function of oncogenes and antioncogenes.

Undergraduate preparation in the biological and physical sciences and in biochemistry is required. A brochure describing the Ph.D. degree program, prerequisites for admission, and research in the department may be obtained by writing the Director of Graduate Studies, Box 3020, Duke University Medical Center, Durham, North Carolina 27710.

214. Fundamentals of Electron Microscopy. Introduction to the basics of transmission electron microscopy. Specimen preparation techniques include: grid preparation, negative staining, metal shadowing, nucleic acid spreading, embedding, and thin sectioning. Students gain experience in the use of the ultramicrotome and electron microscope by working on their own projects. Additional techniques included are ultracyotomy immunoelectron microscopy, freeze-fracture, scanning electron microscopy, and X-ray spectroscopy. C-L: Immunology 214. 3 units. *Miller*

219. Molecular and Cellular Bases of Differentiation. See C-L: Cell Biology 219; also C-L: Biochemistry 219, Immunology 219, and Pathology 219. 3 units. *Counce and staff*

221. Medical Microbiology. An intensive study of common bacteria, viruses, fungi, and parasites which cause disease in humans. The didactic portion of the course focuses on the nature and biological properties of microorganisms causing disease, the manner of their multiplication, and their interaction with the entire host as well as specific organs and cells. 4 units. *Mitchell and staff*

246S. Parasitic Diseases. Prerequisites: Biochemistry 227 or equivalent; and Immunology 244 or Immunology/Microbiology 291. See C-L: Immunology 246S. 3 units. *Balber*

252. General Virology and Viral Oncology. The first half of the course will be devoted to a discussion of the structure and replication of mammalian and bacterial viruses. The second half deals specifically with retroviruses and transformation, which are discussed in terms of the virus-cell interaction, the relationship of viruses and oncogenes to neoplasia, and the role of the immunological response in retrovirus infections. Consent of instructor required. C-L: Immunology 252. 4 units. *Keene and staff*

259. Molecular Biology I: Proteins and Enzymes. Prerequisite: introductory biochemistry or consent of instructor. See C-L: Cell and Molecular Biology 259; also C-L: Biochemistry 259, Cell Biology 259, and Immunology 259. 3 units. *Richardson and staff*

268. Molecular Biology II: Nucleic Acids. Prerequisites: introductory biochemistry and BCH/CMB/CBI/IMM/MIC 259, or consent of instructor. See C-L: Cell and Molecular Biology 268; also C-L: Biochemistry 268, Cell Biology 268, Immunology 268, and The University Program in Genetics. 4 units. *Steege and staff*

269. Advanced Cell Biology. Prerequisite: introductory cell biology or consent of instructor. See C-L: Cell and Molecular Biology 269; also C-L: Botany 269, Cell Biology 269, Immunology 269, and Zoology 269. 3 units. *Siedow and staff*

291. Comprehensive Immunology. See C-L: Immunology 291. 4 units. *Krangel and staff*

For Graduates

304. Molecular Membrane Biology. Prerequisite: Microbiology 269 or consent of instructor. See C-L: Immunology 304. 2 units. *Argon*

310. Molecular Development. Selected topics of current research using molecular and genetic approaches to study development and developmental gene regulation. Focus on mammalian development using the mouse, mouse embryonic stem(ES) cells, and mouse teratocarcinoma cells as models. Lectures and student presentations of research on subjects including differential gene regulation, mouse embryos and oocytes, transgenic mice, maternal imprinting, embryonic stem(ES) cells, immune system development, gene mapping, and regulatory gene families. C-L: Immunology 310. 2 units. *Linney*

325. Medical Mycology. Comprehensive lecture and laboratory coverage of all the fungi pathogenic for humans. Practical aspects as well as future trends in the mycology, immunology, diagnosis, pathogenesis, and epidemiology of each mycotic agent will be explored. There will be several invited lecturers, each an internationally recognized scientist, discussing his or her particular area of mycological expertise and current research. Consent of instructor required. 4 units. *Mitchell*

331. Microbiology Colloquium. Current topics in microbiology with seminars presented by students, faculty, and outside speakers. Required course for all students specializing in microbiology. 1 unit. *Staff*

COURSES CURRENTLY UNSCHEDULED

282. Molecular Microbiology

293. Topics in Cell and Molecular Biology

324. Topics in Molecular Genetics

The University Program in Molecular Biophysics

Professor D. Richardson, *Director* (biochemistry); Associate Professor White, *Director of Graduate Studies* (microbiology); Professors Erickson (cell biology), Hammes (biochemistry); McGown (chemistry), McIntosh (cell biology), Reedy (cell biology), J. Richardson (biochemistry), Shaw (chemistry), Simon (neurobiology), and Spicer (biochemistry); Associate Professors Corless (cell biology), Henkens (chemistry), and Hsieh (biochemistry); Assistant Professors Beese (biochemistry), Fierke (biochemistry), Hellinga (biochemistry), Oas (biochemistry), Prisant (chemistry), Salvesen (pathology), Toone (chemistry), and Van Dongen (pharmacology); Associate Medical Research Professor Taylor (cell biology)

The program in structural molecular biophysics at Duke centers on those research endeavors that use physical measurements to study biological macromolecules and their interactions, where the details of molecular structure are critical to understanding the biological problem in question. The focus is on understanding molecular structure/function at atomic resolution; the breadth extends to detecting molecular events and describing structural relationships in a chemically meaningful way, and relating atomic-level with higher-order structures. There is a commonality in the intellectual approaches and experimental techniques. Research problems addressed within the University Program in Molecular Biophysics include: 3-D structure determination by crystallography and NMR; molecular assemblies studied by various diffraction, spectroscopy, and microscopy techniques; protein folding; molecular modeling and design studies and their direct experimental testing; and functional studies in biochemistry, genetic mechanisms, drug interactions, membrane systems, and so on, for which the details of molecular geometry are central to interpreting the experiments.

Participating students may receive a certificate from the Molecular Biophysics Program in addition to the doctoral degree for their department. Requirements for the certificate ordinarily will include the core courses (Proteins and Enzymes, Physical Biochemistry I, Physical Biochemistry II, Structure of Biological Macromolecules, Membrane Biophysics), lab rotations with molecular biophysics faculty, giving and attending seminars, and an appropriate thesis topic and committee. However, the curriculum can be tailored for students with special interests and backgrounds. For further information about the University Program in Molecular Biophysics, contact the program office at Duke University, Box 3567 RCMR, Durham, North Carolina 27710; mbp@suna.biochem.duke.edu.

222. Structure of Biological Macromolecules. See C-L: Biochemistry 222. 3 units. *J. Richardson and staff*

259. Molecular Biology I: Proteins and Enzymes. Prerequisite: introductory biochemistry or consent of instructor. See C-L: Cell and Molecular Biology 259; also C-L: Biochemistry 259, Cell Biology 259, Immunology 259, and Microbiology 259. 3 units. *D. Richardson and staff*

291. Physical Biochemistry I. Prerequisite: physical chemistry or consent of instructor. See C-L: Biochemistry 291; also C-L: Chemistry 306. 3 units. *Oas and staff*

292. Physical Biochemistry II. Transient kinetics, computational methods, multidimensional NMR, x-ray crystallography, thermodynamics of association. Prerequisite: Physical Biochemistry I or consent of instructor. C-L: Chemistry 307. 3 units. *Toone and staff*

293. Membrane Biophysics. Composition of biological membranes, structure/properties of membrane lipids and proteins (receptors, pores, channels, ion transport ATPases, membrane junctions), mechanical properties of membranes and bilayers, interaction of small molecules with membranes, ionic basis of membrane and action potentials, synaptic transmission. C-L: Cell Biology 293 and Mechanical Engineering 265. 3 units. *McIntosh and staff*

345, 346. Molecular Biophysics Seminar. Required of all molecular biophysics students. 1 unit each. *Oas*

Molecular Cancer Biology

Professor Bell, *Co-director* (molecular cancer biology); Professor Means, *Co-director* (pharmacology); Professor Bennett (biochemistry), *Director of Graduate Studies* (365 CARL Building); Professors Blackshear (medicine and biochemistry), Caron (cell biology), Dawson (immunology), Keene (microbiology), Lefkowitz (medicine and biochemistry), Modrich (biochemistry), Nevins (Genetics), and Sheetz (cell biology); Associate Professors Hannun (medicine and cell biology), Kaufman (medicine and biochemistry), and Shenolikar (pharmacology); Assistant Professors Casey (biochemistry), Garcia-Blanco (molecular cancer biology), Horowitz (molecular cancer biology), Ostrowski (microbiology), Pendergast (pharmacology), Swenson (molecular cancer biology), and Wang (pharmacology)

The program in Molecular Cancer Biology facilitates graduate training in basic science aspects of cancer research. Specifically, program students receive training in areas of normal cell regulation including extracellular signals, receptor-mediated signal transduction, second messengers, protein kinases and phosphatases, transcriptional regulation and cell-cycle control. Aspects of cell-cell interaction and communication and the interaction of cells with the extracellular matrix are also examined. Finally, the program explores the consequences of oncogene activation and tumor-suppressor gene inactivation on such fundamental processes in tumor cells.

The graduate Program in Molecular Cancer Biology is an interdisciplinary program administered by the Department of Molecular Cancer Biology at Duke University Medical Center. Program faculty have primary graduate appointments within one of seven basic science medical center departments. In consultation with the director of graduate studies, students in the program select courses in cell biology, molecular biology, immunology, cancer biology, pharmacology, and developmental biology. For descriptions of the individual courses see the listings under specified departments.

200. Cancer Biology. A comprehensive course in basic and clinical aspects of cancer biology. Topics include a historical review of cancer research, properties of cultured mammalian cells, cell transformation and tumorigenesis, oncogenes and tumor-suppressor genes, cell-cycle regulation, signal transduction, molecular carcinogenesis, cancer epidemiology, and basic science aspects of clinical oncology. 4 units. *Staff*

300. Special Topics in Cancer Biology. 2 units. *Staff*

301. Molecular Cancer Biology Seminar. 1 unit. *Staff*

COURSES WITH MOLECULAR CANCER BIOLOGY CONTENT OFFERED BY PARTICIPATING DEPARTMENTS

Cell Biology

219. Molecular and Cellular Bases of Differentiation. *Counce and staff*

232. Extracellular Matrix and Cell Adhesion. *Bennett and Erickson*

251. Molecular Cell Biology. *Erickson and staff*

269. Advanced Cell Biology. *Nicklas and staff*

417. Cellular Signaling. *Bell, Caron, Casey, Means, and invited lecturers*

Biochemistry

215. Genetic Mechanisms. *Webster and staff*

259. Molecular Biology I: Proteins and Enzymes. *Richardson and staff*

268. Molecular Biology II: Nucleic Acids. *Steege and staff*

Immunology

244. Principles of Immunology. *Kostyu, McClay, and staff*

Microbiology

252. General Virology and Viral Oncology. *Keene and staff*

310. Molecular Development. *Linney*

Pharmacology

233. Essentials of Pharmacology. *Slotkin and staff*

254. Mammalian Toxicology. *Abou-Donia and staff*

Music

Associate Professor Jaffe, *Chair* (105 Mary Duke Biddle Music Building); Associate Professor Gilliam, *Director of Graduate Studies* (068 Mary Duke Biddle Music Building); Professors Silbiger, Todd, and Williams; Associate Professor Bartlet; Assistant Professors Brothers and Lindroth; Associate Professors of the Practice Parkins and Szász; Adjunct Assistant Professor Druesedow; Lecturer Meniker

The Department of Music offers graduate programs leading to the A.M. and Ph.D. degrees in composition, musicology, and performance practice. Students are encouraged to include work outside their main area of concentration within the department. In addition, each of the programs requires course work outside the department.

Applicants for admission to all degree programs will normally have a broad liberal arts background as well as demonstrable musical competence. Those applying to the composition program should submit samples of their compositions with their applications; for the musicology program, applicants should include samples of their writing on musical topics. Upon acceptance to the university, by nomination of the Graduate Faculty in Music, musicology students may also be admitted to the Program in Medieval and Renaissance Studies (see section on Medieval and Renaissance Studies in this bulletin). For the performance practice program, the department encourages applications from advanced musicians who have demonstrated an ability to conduct research about the performance of music in historical contexts. Applicants in performance practice should submit a recording of their work in the field as well as a sample of their writing.

A reading knowledge of one foreign language is required for the A.M. degree; for the Ph.D. degree two languages are required (in performance practice and in musicology, one of these will normally be German). For some dissertation topics a third language may be required.

A detailed description of the requirements for the A.M. and Ph.D. is available upon request from the director of graduate studies.

201. Introduction to Musicology. Methods of research on music and its history, including studies of musical and literary sources, iconography, performance practice, ethnomusicology, and historical analysis, with special attention to the interrelationships of these approaches. 3 units. *Druessedow*

203. Proseminar in Performance Practice. Critical methods in the study of historical performance practice, including the evaluation of evidence provided by musical and theoretical sources, archival and iconographic materials, instruments, and sound recordings. Current issues regarding the performance practice for music from the Middle Ages to the twentieth century. 3 units. *Meniker or Silbiger*

211, 212. Notation. Development and changing function of musical notation from c. 900 to c. 1900, including plainchant notations, black notations, white notations, the invention of printing (particularly movable type and engraving), keyboard and lute tablatures, scores. 3 units each. *Brothers or Williams*

213. Theories and Notation of Contemporary Music. The diverse languages of contemporary music and their roots in the early twentieth century, with emphasis on the problems and continuity of musical language. Recent composers and their stylistic progenitors: for example Ligeti, Bartók, and Berg; Carter, Schoenberg, Ives, and Copland; Crumb, Messiaen, and Webern; Cage, Varèse, Cowell, and Stockhausen. 3 units. *Jaffe or Lindroth*

215. Music Analysis. Historical, philosophical, and ideological issues raised by music analysis. Intensive study of harmony and voice leading in the works of major tonal composers, with emphasis on the analytic approach of Heinrich Schenker. 3 units. *Todd*

217. Selected Topics in Analysis. An exploration of analytical approaches appropriate to a diversity of music, which may include settings of literary texts, pre-tonal music, and music in oral and vernacular traditions. Prerequisite: Music 215 or consent of instructor. 3 units. *Silbiger*

218. Advanced Counterpoint. Selected topics in modal or tonal contrapuntal practice with emphasis on music writing up to five parts. Consent of instructor required for students not registered for doctoral work in composition. 3 units. *Jaffe, Lindroth, or Williams*

Courses dealing with selected topics in the period concerned, at a level between simple surveys and advanced seminars:

222. Music in the Middle Ages. Selected topics. C-L: Medieval and Renaissance Studies. 3 units. *Brothers*

223. Music in the Renaissance. Selected topics. C-L: Medieval and Renaissance Studies. 3 units. *Brothers or Silbiger*

224. Music in the Baroque Era. Selected topics. 3 units. *Meniker, Silbiger, or Williams*

225. Music in the Classic Era. Selected topics. 3 units. *Bartlet or Todd*

226. Music in the Nineteenth Century. Selected topics. 3 units. *Bartlet, Gilliam, or Todd*

227. Music in the Twentieth Century. Selected topics. 3 units. *Gilliam or Todd*

228-229. Collegium Musicum. An opportunity to study and perform vocal and instrumental music from the Middle Ages to the Early Romantic Period. Weekly rehearsals and one or two concerts each semester. A written project required of all participants. Consent of instructor required for all except graduate students in music. C-L: Medieval and Renaissance Studies. 3 units. *Brothers and Meniker*

228A-229A. Collegium Musicum. Same as 228-229, but no project required and no credit awarded. C-L: Medieval and Renaissance Studies. No credit. *Brothers and Meniker*

230. Workshop in Performance Practice. Laboratory for application of historically informed performance practice on instruments appropriate to the period of the music studied. Emphasizes instrumental and vocal chamber music. Open to graduates and undergraduates with consent of instructor. No credit. *Meniker*

236. Nineteenth-Century Piano Music. Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Liszt, and Brahms. The arts of improvisation and transcription, the keyboard virtuoso, the character piece, and the conflict between romantic content and form. 3 units. *Todd*

295S. Composition Seminar. Selected topics in composition. 3 units. *Jaffe or Lindroth*

296S. Analysis of Contemporary Music. Structures, expressive intentions, and functions since 1914. Contemporary orchestral music, American music, European music, popular media, musical tradition, and contemporary composers. Analysis of works performed in the department's Encounters Series with occasional guest composers present. 3 units. *Jaffe or Lindroth*

297, 298, 299. Composition. Weekly independent study sessions at an advanced level with a member of the graduate faculty in composition. 3 units each. *Jaffe or Lindroth*

317S. Seminar in the History of Music. Selected topics. 3 units. *Staff*

318S. Seminar in Performance Practice. A practical seminar in which participants will be expected to perform, to introduce the work to be played or sung, and to outline its interpretative problems. A list of the music concerned will be posted in advance, and all students will participate in the study (if not necessarily in the performance) of the works announced. It is expected that the seminar will cover most periods, from Gregorian chant to twentieth-century repertoires. Consent of instructor required. 3 units. *Williams*

331, 332, 333. Independent Study in Performance Practice and Interpretation. The exploration of significant interpretive and performance-practice issues as they affect a specific repertory. Weekly meetings with a member of the graduate faculty. Consent of instructor and director of graduate studies required. 3 units each. *Staff*

390. Independent Study. With the consent of a graduate faculty member and the approval of the director of graduate studies, the student will undertake a specialized research project of his/her own choosing. 3 units. *Staff*

397, 398, 399. Composition. Weekly independent studies at the doctoral level with a member of the graduate faculty in composition. 3 units each. *Jaffe or Lindroth*

COURSES CURRENTLY UNSCHEDULED

341S. History of Music Theory to Rameau

351S. Studies in Musical Iconography

361S. Musical Organology

382S. Studies in Ethnomusicology

Neurobiology

Professor Purves, *Chair* (101I Bryan Research Building); Associate Professor Matthew, *Director of Graduate Studies* (301E Bryan Research Building); Professors Abou-Donia, W. C. Hall, W. G. Hall, McClay, McNamara, Roses, Simon, Slotkin, Somjen, and Staddon; Associate Professors Augustine, Cant, Casseday, Corless, Erickson, Fitzpatrick, Katz,

Nadler, Schmechel, Skene, Strittmatter, Tyrey, and Wong; Assistant Professors Boustany, Fremeau, Kauer, LaMantia, Lewis, Lo, Mooney, Nowicki, Reinhart, Schwartz, and Turner; Professors Emeriti Diamond, Moore, and Robertson; Assistant Research Professors Covey, Einstein, and Madison

At a time when many questions in biology have been eloquently answered, both scientists and the public correctly perceive that the brain remains, in fundamental ways, a profound mystery. During the last century tremendous advances have been made in understanding the structure, function, chemistry, and development of the brain. Nonetheless, broad and important questions about this complex organ remain to be answered in both biology and medicine. These include how genetic instructions are linked to brain development, the basis of learning and memory, the nature of consciousness, and the etiology and proper treatment of neurological diseases such as epilepsy and Alzheimer's disease.

The ways that neurobiologists approach these problems, while generally reductionist, are diverse. Preeminent are the techniques of molecular biology and molecular genetics, a host of sophisticated electrophysiological methods for detecting the activity of individual nerve cells or groups of nerve cells, and a wealth of anatomical methods for seeing the structure and connections of nerve cells. Novel and increasingly noninvasive means of imaging the nervous system—by nuclear magnetic resonance, detection of positron emission, or activity related magnetic fields—also hold great promise for better understanding the brain. Despite the power of these methods, progress in neurobiology—much as progress in any science—will depend on a few important insights arising from the imagination of neuroscientists who think deeply about these issues. The purpose of the graduate program in neurobiology is to enable talented students to think about the nervous system at this level.

Neuroscientists at Duke work with the conviction that advances in understanding the brain will come from the application of a wide range of approaches and techniques. This conviction is reflected in the fact that neuroscience at Duke is pursued in a variety of departments and settings, all of which are possible sites for students who wish to be trained in this field. Although much of this research is carried out in the Department of Neurobiology at Duke University Medical Center, several departments on the undergraduate campus also participate in this work. There are now 44 faculty members associated with the graduate program in neurobiology at Duke, and a large and diverse body of students and other professionals engaged in neurobiological research.

Students in the graduate program in neurobiology take a core curriculum that covers the major subfields of contemporary neurobiology, but are generally free to pursue—with the help of faculty advisors—a course of study tailored to their needs, backgrounds, and individual interests. The four core courses in the Department of Neurobiology are 208, Cellular Neurobiology; 209, Systems Neurobiology; 211, Developmental Neurobiology; and 212, Molecular Neurobiology.

202. Basic Neurobiology. A systematic introduction to the structure and function of the mammalian nervous system designed specifically for first-year medical students. Lectures, laboratory exercises, clinical presentations, and problem-solving conferences during the month of January. 4 units. *Purves and staff*

208. Cellular Neurobiology. (Graduate Core Course.) Basic principles of neural electrical activity. Areas of emphasis will include action potential generation, ion channel structure/function relationships, modulation of channel activity, neurotransmitter secretion, transmitter receptors and mechanisms of synaptic plasticity. Consent of instructor required. Spring. C-L: Cell Biology 208. 3 units. *Augustine, Kauer, Lo, and Reinhart*

209. Systems Neurobiology. (Graduate Core Course.) Structure and function of the mammalian sensory and motor systems. Consent of instructor required. Fall. 3 units. *Cant and Fitzpatrick*

210. Individual Study. Directed reading and research in neurobiology. Consent of director of graduate studies required. 3 to 9 units each. Variable credit. *Staff*

211. Developmental Neurobiology. (Graduate Core Course.) The development of the nervous system covering both the history and present status of the major issues in this field. Consent of instructor required. Fall. 3 units. *Katz and Puroes*

212. Molecular Neurobiology. (Graduate Core Course.) The macromolecules responsible for the specialized functions of neurons and glia. Topics stress the biochemical, molecular, cellular, and genetic processes involved in the development and function of the mammalian nervous system. Introductory biochemistry is recommended. Consent of instructors required. Spring. 3 units. *LaMantia, Lo, Mattheu, and Skene*

214. The Neural Basis for Sensory-Motor Integration. A fundamental question in neurobiology—how sensory and motor systems interact in the brain to produce adaptive behavior—examined by studying original papers that have contributed to the understanding of the different roles played by the basal ganglia, brainstem, cerebellum, and cortex. Particular attention to a well-studied model behavior, orienting movements of the head and eyes toward the source of an auditory or visual stimulus. Consent of instructor required. 3 units. *Diamond and W. C. Hall*

280. Student Seminar. Preparation and presentation of seminars to students and faculty on topics of broad interest in neurobiology. Required of all first- and second-year neurobiology students. 1 unit. *Augustine and Katz*

312. Advanced Topics in Neurobiology. Journal club format covering a variety of topics in neurobiology, e.g., sensory transduction, neurobiology of disease. Focus on critical reading of the literature. Consent of instructor required. 1 unit. *Staff*

360. Neuropharmacology. Seminar-lecture course emphasizing neurotransmitter mechanisms and the mechanisms of action of drugs used to modify nervous system function. Material will be drawn from recent literature. Consent of instructor required. C-L: Pharmacology 360. 3 units. *Wilson*

364. Neurotoxicology. See C-L: Pharmacology 364. 3 units. *Abou-Donia and staff*

372. Research in Neurobiology. Laboratory research in various areas of neurobiology. Credit to be arranged. Variable credit. *Staff*

COURSES CURRENTLY UNSCHEDULED

222. Behavioral and Neural Modeling

266S. Comparative Neurobiology

Pathology

Professor Pizzo, *Chair* (301B Davison); Assistant Professor Salvesen, *Director of Graduate Studies* (207 Jones); Professors Adams, D. Bigner, S. Bigner, Bossen, Bradford, Graham, Ideker, Jennings, Johnston, Klintworth, Koepke, Reimer, Shelburne, Sommer, and Wittels; Associate Professors Crapo, Greenberg, Hoffman, Kane, Proia, Reimer, and Zwadyk; Assistant Professors Dewhurst, Enghild, Friedman, Jirtle, Kurtzberg, Lewis, Schold, and Zalutsky; Associate Research Professor Wikstrand; Assistant Clinical Professor Vollmer; Adjunct Associate Professor Swenberg

The Department of Pathology offers graduate work leading to the Ph.D. degree with areas of specialization such as subcellular and molecular pathology. Course work is designed to give a broad background in classical and modern pathology with emphasis on the application of modern research techniques. Students will be required to take such courses as are necessary to obtain a broad foundation, as well as courses applicable to areas of specialty and research. Further information including brochures giving details of departmental facilities, staff, trainee stipends, and the M.D.-Ph.D. program are available from the director of graduate studies.

219. Molecular and Cellular Bases of Differentiation. See C-L: Cell Biology 219; also C-L: Biochemistry 219, Immunology 219, and Microbiology 219. 3 units. *Counce and staff*

250. General Pathology. Presentation of the fundamentals of pathology. Senior staff members give lectures developing broad concepts of disease processes. Emphasis is on etiology and pathogenesis of disease. Prerequisites: histology and consent of instructor. 4 units. *Steenbergen and staff*

251. Laboratory Course in General Pathology. Laboratory session to complement Pathology 250. Gross and microscopic material is correlated with and related to disease processes. Pathology 250 may be taken concurrently. Prerequisites: histology and consent of instructor. 4 units. *Steenbergen or staff*

258. Cellular and Subcellular Pathology. This course is designed for students wishing to broaden their knowledge of cellular structure and cellular pathology, and consists of lectures and seminars discussing the alterations in cellular structure and associated functions that accompany cell injury. Consent of instructor required. Hours to be arranged. 2 units. *Shelburne and Sommer*

275. Fundamentals of Electron Microscopy and Biological Microanalysis. Emphasis will be placed on preparative procedures including freezing techniques and on the application of electron microscopy to ultrastructural pathology. Scanning electron microscopy, X-ray microanalysis, and scanning ion microscopy will be discussed in addition to conventional transmission electron microscopy. Limited laboratory experience included. 3 units. *Ingram, Shelburne, and Sommer*

325. Cardiovascular Pathology. Study of cardiovascular disease processes, reviewing anatomic, embryologic, and physiologic features, and utilizing case material and gross specimens. Consideration of principles of electrocardiography. Consent of instructor required. 3 units. *Reimer and staff*

353. Advanced Neuropathology. Current problems and research methods related to diseases which affect the nervous system. Consent of instructor required. 3 units. *Graham and staff*

355. Graduate Seminar in Pathology. Discussions outlining the scope of modern pathology. This will include reports of original researchers by members of staff and visitors. 1 unit. *Salvesen*

357. Research in Pathology. Independent research projects in various fields of pathology. Hours and credit to be arranged. Variable credit. *Graduate faculty*

361, 362. Autopsy Pathology. A detailed consideration of the morphologic, physiologic, and biochemical manifestations of disease. Emphasis is on individual work in the laboratory with tutorial supervision. Gross dissection; histologic examination; processing; analysis of morphologic, microbiologic, and biochemical data; and interpretation of results. For advanced students. 3 to 6 units each. Prerequisites: Pathology 250 and consent of instructor. Variable credit. *Proia and staff*

364. Systemic Pathology. Systematic presentation of the characteristics of disease processes as they affect specific organ systems. Consent of instructor required. 6 units. *Staff*

367. Special Topics in Pathology. Special problems in pathology will be studied with a member of the senior staff; the subject matter will be individually arranged. Hours to be arranged. 2 to 4 units. Variable credit. *Pizzo and staff*

369. Ophthalmic Pathology. Lectures, seminars, and laboratory sessions. Review of the normal anatomy and embryology of the eye as a basis for the study of the various ocular disease processes. The more common diseases of the eye will be considered in detail. Problems in ophthalmic pathology discussed together with methods of solving them. 3 units. *Klintworth*

370. Developmental Pathology and Teratology. A systematic study of disease processes involving the prenatal, natal, and postnatal period. Emphasis on developmental anatomy and teratogenesis. The format includes seminars and clinicopathologic correlations derived from gross and microscopic material. Prerequisites: Pathology 250 and anatomy and histology. 3 units. *Bradford*

374. Pulmonary Pathology and Postmortem Pathophysiology. Emphasis will be on pulmonary pathology and pathophysiology of infectious, metabolic, environmental, and neoplastic diseases, and certain diseases of unknown etiology (e.g., sarcoid, alveolar proteinosis). Ventilatory experiments will be done on excised human lungs. 3 units. *Rogli and staff*

377. Pathology of the Kidney. A comprehensive study of pathological, immunological, and clinical features of the glomerulonephritis, and pyelonephritis, as well as of metabolic, congenital, and neoplastic renal disorders. Lectures will be supplemented with gross and microscopic specimens, demonstrations, and special library studies. 3 units. *Howell*

380. Diagnostic Immunology. Diagnostic and laboratory procedures used in evaluating immunologic diseases: especially autoimmune, infectious, immunodeficiency, immunoproliferative, and hypersensitivity disorders. Emphasis on the theoretical and practical aspects of testing procedures and their proper interpretation. Consent of instructor required. 2 units. *R. Buckley, Howell, and Zwadyk*

382. General Pathology for Toxicologists. General principles of pathology using examples from human and experimental toxicological disease. Prerequisites: courses in biochemistry, physiology, and histology (histology may be taken concurrently). 3 units. *Graham, Jennings, and pathologists from UNC and Research Triangle Park*

385. Molecular Aspects of Disease. Background investigative methods, and recent advances in understanding the molecular basis of selected diseases. In-depth focus on a small number of diseases whose defects are known at genetic or molecular levels. Current integrative approaches to the study of human biology and disease. Prerequisites: introductory cell biology and biochemistry courses. 3 units. *Salvesen and staff*

COURSES CURRENTLY UNSCHEDULED

360. Cytochemistry

381. Cancer Biology

Pharmacology

Professor Means, *Chair* (407 Nanaline H. Duke); Associate Professor Kuhn, *Director of Graduate Studies* (401-I Bryan Research); Professors Abou-Donia, Ellinwood, Kirshner,

Mills, Nadler, Schanberg, Slotkin, Stiles, and Strauss; Associate Professors McNamara, Schwartz, Shenolikar, and Whorton; Assistant Professors Fine, Freneau, Heitman, Hellinga, Meyer, Pendergast, Schwinn, VanDongen, and Wang; Professors Emeriti Lack, Ottolenghi, and Wilder; Associate Research Professor Bartolome; Medical Research Professors Elion and Wilson

Pharmacology offers a graduate program which leads to the Ph.D. degree. Training is available in the following specific areas of pharmacology: neuropharmacology, toxicology, developmental, cardiovascular, behavioral, and endocrine pharmacology, regulation of cell growth and differentiation (cancer pharmacology), cellular signaling and receptor structure and function. Because pharmacology is an interdisciplinary science, the department considers applicants with strong undergraduate backgrounds in biological, chemical, and neural sciences. There is no foreign language requirement.

For Seniors and Graduates

200. Medical Pharmacology. Pharmacology for medical and graduate students. The action of drugs in relation to biochemical and physiological processes and the rationale for their clinical use. Additional topics include pharmacokinetics, drugs of abuse, and commonly encountered toxins. Nine lectures and one small-group, case-based discussion per week for eight weeks, April-June. 4 units. *Nadler and staff*

210, 211. Individual Study and Research. Directed reading and research in pharmacology. Consent of director of graduate studies required. 3 to 9 units each. Variable credit. *Staff*

233. Essentials of Pharmacology. Drug absorption, distribution, excretion, and metabolism. Structure and activity relationships; drug and hormone receptors and target cell responses. Consent of instructor required. Prerequisites: introductory biology; Chemistry 151L; Mathematics 31 and 32. 4 units. *Slotkin and staff*

234. Interdisciplinary Approach to Pharmacology. Several model systems (cardiovascular, reproductive, neural, and cell cycle) will be used to explore the molecular, biochemical, and physiologic basis of drug action. 4 units. *Shenolikar and staff*

254. Mammalian Toxicology. Principles of toxicology as related to humans. Emphasis on the molecular basis for toxicity of chemical and physical agents. Subjects include metabolism and toxicokinetics, toxicologic evaluation, toxic agents, target organs, toxic effects, environmental toxicity, management of poisoning, epidemiology, risk assessment, and regulatory toxicology. Prerequisites: introductory biology, and Chemistry 151L, or consent of instructor. 4 units. *Abou-Donia and staff*

280. Student Seminar in Pharmacology. Preparation and presentation of seminars to students and faculty on topics of broad interest to pharmacology. Required of all pharmacology graduate students. 2 units. *Whorton*

For Graduates

314. Integrated Case Studies in Toxicology. Students are assigned topics relative to their chosen research discipline in toxicology and are asked to develop case studies to present at a roundtable workshop. Emphasis on review and analysis of toxicological problems from a holistic (multidisciplinary) viewpoint. Offered on demand. C-L: Environment 314. 1 unit. *Abou-Donia and Richardson*

331. Laboratory Methods in Pharmacology. Tutorial laboratory training in various fields of pharmacology including neuropharmacology, cardiovascular pharmacology, biochemical pharmacology, and biophysical pharmacology. Consent of instructor required. 3 to 6 units. Variable credit. *Staff*

347, 348. Seminar in Toxicology. A weekly research seminar throughout the year is required of participants in the Toxicology Program. Students, faculty, and invited speakers present their findings. 1 unit each. *Abou-Donia*

360. Neuropharmacology. Seminar-lecture course emphasizing neurotransmitter mechanisms and the mechanisms of action of drugs used to modify nervous system function. Material will be drawn from recent literature. Consent of instructor required. C-L: Neurobiology 360. 3 units. *Wilson*

364. Neurotoxicology. Adverse effects of drugs and toxicants on the central and peripheral nervous system; target sites and pathophysiological aspects of neurotoxicity; factors affecting neurotoxicity, screening and assessment of neurotoxicity in humans; experimental methodology for detection and screening of chemicals for neurotoxicity. C-L: Neurobiology 364. 3 units. *Abou-Donia and staff*

372. Research in Pharmacology. Laboratory investigation in various areas of pharmacology. Credit to be arranged. Variable credit. *Staff*

417. Cellular Signaling. See C-L: Cell Biology 417; also C-L: Biochemistry 417. 3 units. *Bell, Caron, Casey, Means, and invited lecturers*

423. Neurobiological Basis of Behavior. Survey of neuroanatomical, neurophysiological, neurochemical, and neuropharmacological evidence of central nervous system function as it relates to normal and abnormal behavior. Clinical description, measurement of function, as well as the biological substrates of affective disorders and psychoses will be emphasized. Scientific bases of current therapeutic procedures, especially psychopharmacological, will be examined. Prerequisites: familiarity with basic neuroanatomy, neurophysiology and neuropharmacology is assumed. 4 units. *Ellinwood and staff*

COURSES CURRENTLY UNSCHEDULED

219. Tutorial in Pharmacology

Philosophy

Professor Flanagan, *Chair* (201E West Duke); Associate Professor Posy, *Director of Graduate Studies* (201D West Duke); Professors Brandon, Golding, Mahoney, and Sanford; Associate Professor Ferejohn; Assistant Professors Cooper, Lind, and Schmaltz; Professors Emeriti Peach and Welsh

The Department of Philosophy offers graduate work leading to the A.M. and Ph.D. degrees. Tutorial work complements formal instruction. Students may, after taking a balanced program, specialize in any of the following fields: the history of philosophy, logic, philosophy of science, epistemology, metaphysics, philosophy of mind, philosophical analysis, ethics, aesthetics, political philosophy, philosophy of law, philosophy of medicine, and philosophy of religion.

Individual programs of study are developed for each student. Prior to being admitted to candidacy for the Ph.D. degree, the student must demonstrate a competence in one foreign language and must successfully complete a series of essays and examinations covering the following: logic and formal philosophy; value theory; metaphysics, epistemology, and philosophy of science; and the history of philosophy. In these exercises students are expected to combine factual knowledge with critical understanding. Work in a minor or related field, not necessarily confined to any one department, is encouraged but not required. A minor normally includes 6 units for the A.M. or the Ph.D. degree and may include more as a student's program requires or permits.

A student who meets the general requirements of the Graduate School may earn the A.M. degree in philosophy by passing an oral master's examination. This examination, which can be the defense of either a master's thesis or an alternative academic

exercise approved by the department and the student's committee, is normally given in the student's fourth term of full-time registration. The examination can be given earlier in two special circumstances:

1. A student with a strong undergraduate background in philosophy who satisfies the department of his or her qualifications by submitting several samples of written work before beginning the program may be admitted to the master's program with the understanding that the master's examination can be given in the second or third term of full-time registration.
2. A student who combines the A.M. program in philosophy with another advanced degree program, such as the programs for the J.D., the M.D., or the Ph.D. in another field, will register as a full-time graduate student of philosophy for only two terms, the minimum registration that meets the general requirements of the Graduate School for the A.M. degree. These two terms of full-time registration need not be consecutive, and their position in the student's overall program is determined in individual cases. A student in a combined program will normally do some work in philosophy while registered in the student's primary program and do some work in the primary field while registered in philosophy. The master's examination can be given in the second term of full-time registration as a philosophy graduate student or in a later term when the student is registered in the primary program. A student in the philosophy Ph.D. program who meets the general requirements of the Graduate School for the A.M. degree may earn this degree by completing the preliminary exercises for the Ph.D. degree.

A reading knowledge of at least one foreign language, ancient or modern, is required for the Ph.D. degree. Students must satisfy this requirement by the end of the fifth semester of residency. More than one language may be required where this is judged appropriate to the research demanded by the candidate's dissertation.

For Seniors and Graduates

203S. Contemporary Ethical Theories. The nature and justification of basic ethical concepts in the light of the chief ethical theories of twentieth-century British and American philosophers. 3 units. *Flanagan, Golding, or Lind*

204S. Philosophy of Law. Natural law theory and positivism; the idea of obligation (legal, political, social, moral); and the relation of law and morality. 3 units. *Golding*

206S. Responsibility. The relationship between responsibility in the law and moral blameworthiness; excuses and defenses; the roles of such concepts as act, intention, motive, ignorance, and causation. 3 units. *Golding*

208S. Political Values. Analysis of the systematic justification of political principles and the political values in the administration of law. 3 units. *Golding*

210. Logic for Computer Science. See C-L: Computer Science 242. 3 units. *Loveland or Nadathur*

211S. Plato. Selected dialogues. C-L: Classical Studies 211S. 3 units. *Ferejohn*

217S. Aristotle. Selected topics. C-L: Classical Studies 217S. 3 units. *Ferejohn*

218S. Medieval Philosophy. Selected problems. C-L: Medieval and Renaissance Studies. 3 units. *Mahoney*

219S. Late Medieval and Renaissance Philosophy. Selected problems. C-L: Medieval and Renaissance Studies. 3 units. *Mahoney*

225S. British Empiricism. A critical study of the writings of Locke, Berkeley, or Hume with special emphasis on problems in the theory of knowledge. 3 units. *Lind or Schmaltz*

227S. Continental Rationalism. A critical study of the writings of Descartes, Spinoza, or Leibniz with special emphasis on problems in the theory of knowledge and metaphysics. 3 units. *Schmaltz*

228S. Recent and Contemporary Philosophy. A critical study of some contemporary movements, with special emphasis on analytic philosophers. 3 units. *Posy*

231S. Kant's Critique of Pure Reason. 3 units. *Posy*

232S. Recent Continental Philosophy. Selected topics. 3 units. *Staff*

233S. Methodology of the Empirical Sciences. Recent philosophical discussion of the concept of a scientific explanation, the nature of laws, theory and observation, probability and induction, and other topics. Consent of instructor required. 3 units. *Brandon or Cooper*

234S. Problems in the Philosophy of Biology. Selected topics, with emphasis on evolutionary biology: the structure of evolutionary theory, adaptation, teleological or teleonomic explanations in biology, reductionism and organicism, the units of selection, and sociobiology. Consent of instructor required. C-L: Botany 234S and Zoology 234S. 3 units. *Brandon*

235S. Nineteenth-Century German Philosophy. A critical examination of the writings of Hegel, Marx, or Nietzsche. 3 units. *Staff*

250S. Topics in Formal Philosophy. Topics selected from formal logic, philosophy of mathematics, philosophy of logic, or philosophy of language. 3 units. *Posy*

251S. Epistemology. Selected topics in the theory of knowledge; for example, conditions of knowledge, scepticism and certainty, perception, memory, knowledge of other minds, and knowledge of necessary truths. 3 units. *Sanford*

252S. Metaphysics. Selected topics: substance, qualities and universals, identity, space, time, causation, and determinism. 3 units. *Sanford*

253S. Philosophy of Mind. Analysis of concepts such as thought and belief; issues such as mind-body relations, thought and action, the nature of persons and personal identity. 3 units. *Sanford*

289S. Environmental Ethics. Selected topics involving values and the environment, for example, extending morality to nature, rights of future generations, environmental aesthetics, diversity and stability, ideological biases in ecological knowledge. Consent of instructor required. C-L: Environment 282S. 3 units. *Cooper*

291S, 292S. Special Fields of Philosophy. 3 units each. *Staff*

For Graduates

300. Problems in the Theory of Value and Judgment. See C-L: Literature 300; also C-L: English 386. 3 units. *B. H. Smith*

311. Philosophy and Medicine. The scope of medicine as a philosophical problem, the concept of health, and investigation of ethical issues arising in medical contexts. Consent of instructor required. 3 units. *Golding*

COURSES CURRENTLY UNSCHEDULED

202S. Aesthetics: The Philosophy of Art

205S. Philosophy of History

254S. Topics in Philosophy of Religion

331, 332. Seminar in Special Fields of Philosophy

Physical Therapy

Professor Bartlett, *Chair* (050 Hospital); Assistant Professor Gwyer, *Director of Graduate Studies* (050 Hospital); Associate Professors Duncan, Schenkman, and Villanueva; Assistant Clinical Professors Chandler, Figuers, and Riordan; Clinical Associates Dore, Lawrence, and Ross; Professors Emeriti Branch and Horton

The Department of Physical Therapy offers an entry level professional program leading to the M.S. degree. To be eligible for admission to the program, applicants must have obtained a baccalaureate degree and have a background in the basic sciences and social sciences, including course work in biology, chemistry, physics, and psychology.

The program is designed to provide for integration of classroom knowledge and clinical learning experiences essential for the competent practice of physical therapy. In view of this integrated curriculum, failure in a major course within a semester would prevent the student from continuing in the program. Major courses are all courses offered by the Department of Physical Therapy as well as required courses offered by the Departments of Biological Anthropology and Anatomy, and Neurobiology. A grade of F (or noncredit in the case of Physical Therapy 343 and 344) in any of these courses will occasion withdrawal from the program. Program requirements also include a comprehensive examination at the completion of the curriculum and a research project. Further information may be obtained from the Director of Graduate Studies, Department of Physical Therapy, Box 3965, Duke University Medical Center, Durham, North Carolina 27710.

210. Independent Study. Designed for nonmajors. Consent of instructor required. Credit to be arranged. Variable credit. *Staff*

301. Introduction to Scientific Inquiry. Theory and methods of research process, research design, data collection, preparation of a research proposal. 2 units. *Gwyer and staff*

303. Research. Completion of a research project under the supervision of a faculty adviser; instruction in statistical techniques and the use of the computer. 3 to 5 units. Variable credit. *Gwyer and staff*

313. Physical Agents. Physical aspects and physiological effects of selected physical agents, including massage, superficial heat and cold, ultraviolet, diathermy, and ultrasound. 2 units. *Figuers*

314. Electrotherapy and Electrodiagnosis. Physical aspects and therapeutic effects of electrical currents. Electrodiagnostic testing, introduction to electromyography and nerve conduction studies. 1 to 2 units. Variable credit. *Dore*

317. Kinesiology. Fundamentals of arthrology and myology, movement and joint description, surface anatomy, principles of biomechanics and anthropometry. 2 units. *Villanueva*

318. Arthrology and Pathokinesiology. Detailed study of the arthrology and kinesiology of the trunk and limbs during normal and pathological conditions, with emphasis on the sequential electromyographic and joint motion analysis of body segments during selected human movement patterns, including locomotion. 3 units. *Villanueva*

319. Introduction to Evaluation and Patient Care. Orientation to basic patient care skills, including reaction to illness. Introduction to Problem-Oriented Record System.

Principles and methods of evaluation, including assessment of muscle function, joint mobility, neurological and respiratory function, posture, gait, and physical level of independence. Opportunities for direct patient care in laboratory and clinic. 3 units. *Ross and Villanueva*

320. Evaluation and Therapeutic Procedures I. Specific assessment of neuromuscular and cardiopulmonary functions. Physiological basis of therapeutic intervention and specific exercise programs. 3 units. *Chandler and staff*

321. Evaluation and Therapeutic Procedures II. Assessment and treatment of specific neuromuscular and cardiopulmonary problems. Introduction to techniques of neuromuscular facilitation. 2 units. *Figuers*

322. Evaluation and Therapeutic Procedures III. Introduction to the neurophysiological basis for evaluation and treatment of children and adults with central nervous system disorders; emphasis on assessment of abnormal movement and selection of appropriate therapeutic programs. Problems associated with spinal cord injuries, methods of therapeutic intervention, and functional testing. 3 units. *Bartlett, Duncan, and Schenkman*

332. Physical Therapy and Health Services: Administration and Issues. Planning, organizing, delivering, and evaluating physical therapy and health services. Examination of health policy and issues. Principles of administration, leadership styles, and management roles. 2 units. *Bartlett and Riordan*

333. Human Development: Pediatrics/Geriatrics. Aspects of normal human development throughout the life cycle. Clinical features and management of common pediatric and geriatric problems. 2 units. *Riordan and staff*

334. Introductory Pathology. Fundamentals of pathology with emphasis on broad concepts of disease. 2 units. *Staff*

335. Orthopedics. Detailed examination of the musculoskeletal system, through lecture and laboratory, and the application of findings to the establishment of physical therapy care plans. Introduction to common orthopedic problems and their medical and surgical management. 2 units. *Lawrence*

336. Medical Sciences. The clinical manifestations and management of common medical and surgical disorders. Lectures by physicians, physical therapists, clinical pharmacists, and other health personnel; selected laboratory experiences. Areas covered include prosthetics and orthotics, burns, rheumatology, cardiopulmonary disorders, neurology, and neurosurgery. Seminars in patient management. 3 units. *Gwyer and Ross*

340. Special Topics in Physical Therapy. Opportunity for study under the direction of an individual staff member. Consent of director of graduate studies required. Credit to be arranged. Variable credit. *Staff*

343. Directed Clinical Experience in Physical Therapy II. Full-time supervised clinical learning experiences in physical therapy settings within limited radius of the university. 2 units. *Figuers and clinical staffs*

344. Directed Clinical Experience in Physical Therapy III. Full-time supervised clinical learning experiences in physical therapy settings throughout the country. 3 units. *Figuers and clinical staffs*

COURSES CURRENTLY UNSCHEDULED

302. Research

342. Directed Clinical Experience in Physical Therapy I

Physics

Professor Evans, *Chair* (108 Physics); Professor Weller, *Director of Graduate Studies*; Professors Behringer, Bilpuch, Fortney, Goshaw, Han, Johnson, Madey, Meyer, Müller, Palmer, Roberson, Robinson, Thomas, and Walter; Associate Professors Greenside, Howell, and Oh; Assistant Professors Gauthier, Lee, Litvinenko, Socolar, Springer, and Teitsworth; Professors Emeriti Biedenharn, Fairbank, Lewis, and Walker; Research Associate Professor Tornow; Research Assistant Professor Phillips; Adjunct Professors Ciftan, Guenther, and Stroschio; Adjunct Associate Professor Skatrud; Adjunct Assistant Professor Everitt

The Department of Physics offers graduate work for students wishing to earn the A.M. or Ph.D. degree. In addition to a balanced program of basic graduate courses, the department offers specialized courses and seminars in several fields in which research is being done by faculty and staff. With the help of faculty advisers, students select a course program to fit their individual backgrounds and goals, often including work in a related field. Students are encouraged to begin research work early in their careers.

For Seniors and Graduates

205. Introduction to Nuclear Physics. Phenomenological aspects of nuclear physics, interaction of gamma radiation and charged particles with matter, nuclear detectors, particle accelerators, radioactivity, basic properties of nuclei, nuclear systematics, nuclear reactions, particle scattering, nuclear models of the deuteron, nuclear forces, parity. 3 units. *Weller*

211. Fundamentals of Quantum Mechanics. Waves and particles, Schrödinger equation, Dirac notation and mathematical tools, fundamental postulates, angular momentum and addition of angular momentum, applications to spin systems, harmonic oscillators, and the hydrogen atom. Prerequisites: Mathematics 111 and Physics 181. 3 units. *Springer*

212. Applications of Quantum Mechanics. Application of the fundamental postulates to atomic structure and spectra, solid state phenomena, statistical physics, scattering, perturbative techniques, treatment of systems of identical particles, and nuclear and particle physics phenomenology. Prerequisite: Physics 211. 3 units. *Staff*

213. Nonlinear Dynamics. Prerequisites: Computer Science 8 or 53, Mathematics 111, and Physics 51L, 52L. See C-L: Computer Science 264. 3 units. *Behringer or Greenside*

214. Introduction to Solid-State Physics. Discussion of solid-state phenomena including crystalline structures, X-ray and particle diffraction in crystals, lattice dynamics, free electron theory of metals, energy bands, and superconductivity, with emphasis on understanding electrical and optical properties of solids. Prerequisite: quantum physics at the level of Physics 143L or Electrical Engineering 211. C-L: Electrical Engineering 214. 3 units. *Teitsworth*

217S. Advanced Physics Laboratory and Seminar. Experiments involving the fields of electricity, magnetism, heat, optics, and modern physics. 3 units. *Meyer*

220. Electronics. Basic elements of modern electronics including AC circuits, transfer functions, solid-state circuits, transistor circuits, operational amplifier applications, digital circuits, and computer interfaces. 3 units. *Fortney*

222S. General Relativity. Review of special relativity; ideas of general relativity; mathematics of curved space-time; formation of a geometric theory of gravity; Einstein field equation applied to problems such as the cosmological red-shift and blackholes. Prerequisites: Physics 181 and Mathematics 111 or equivalents. 3 units. *Lee*

230. Mathematical Methods in Physics. Includes topics in complex analysis, residue calculus, infinite series, integration, special functions, Fourier series and transforms, delta functions, and ordinary differential equations; and use of MATHEMATICA for graphical, symbolic, and numerical computation. Prerequisite: Mathematics 111. 3 units. *Palmer*

231. Mathematical Methods in Electromagnetism. Mathematical topics include vector calculus, curvilinear coordinates, partial differential equations, orthogonal functions, Legendre polynomials, spherical harmonics, Bessel functions, and Green's functions. Topics from electromagnetism include Maxwell's equations, electrostatics, magnetostatics, potential theory, boundary-value problems, macroscopic media, and electromagnetic waves. Uses MATHEMATICA. Prerequisite: Physics 230. 3 units. *Palmer*

244. Nuclear and Particle Physics. Current ideas and models in nuclear and particle physics. Experimental methods; nuclear structure; nuclear reactions; families of elementary particles; quarks and gluons; weak interactions. Prerequisite: Physics 211. 3 units. *Staff*

261. Laser Physics. Laser physics and laser theory. Electromagnetic radiation and its interaction with matter. Laser excitation, oscillation, modulation, and detection theory. Prerequisites: Physics 182 and Physics 211. 3 units. *Skatrud*

271. Quantum Optics. The linear and nonlinear interaction of electromagnetic radiation and matter. Topics include simple theory of lasers, second-harmonic generation, photon echos, bistability, Raman scattering, Brillouin scattering, phase conjugation, two photon lasers, and cooling and trapping of atoms. Prerequisites: Physics 212 and 231. 3 units. *Gauthier*

281. Classical Mechanics. Newtonian, Lagrangian, and Hamiltonian methods for classical systems; symmetry and conservation laws; rigid body motion; normal modes and forced oscillations; small nonlinear oscillations; canonical transformations; Hamiltonian chaos. 3 units. *Socular*

For Graduates

303. Introduction to Statistical Mechanics. Fundamentals of kinetic theory, thermodynamics, and statistical mechanics with applications to physics and chemistry. Prerequisite: Physics 215. 3 units. *Behringer or Greenside*

304. Advanced Topics in Statistical Mechanics.* This course will vary from year to year. Possible topics include Fermi liquids, systems of bosons, many-body theory, nonequilibrium statistical mechanics. Prerequisites: Physics 303 and 316. 3 units. *Staff*

307. Introduction to Condensed Matter Physics. Microscopic structure of solids, liquids, liquid crystals, polymers, and spin systems; elastic scattering and long-range order; topological defects; electronic structure of crystals (metals and semiconductors); phonons and inelastic scattering; magnetism; superconductivity. Prerequisite: Physics 215, 231, 303. 3 units. *Socular or Teitsworth*

308. Introduction to High-Energy Physics. An overview of elementary particles and forces studied by experiments carried out at the frontier of high-energy physics. Discussion of basic symmetry principles and conservation laws of nature and review of their experimental tests. Development of the quark model of hadrons and comparisons

*Offered on demand.

with observed particle spectra. Review of the Standard Model by comparing predictions to current experimental measurements. 3 units. *Goshaw*

310. Advanced Solid-State Physics. Advanced energy band theory; Fermi liquid theory; many-body Green functions and diagrammatic techniques; interacting electron gas; superconductivity; applications. Prerequisite: Physics 307 or equivalent. 3 units. *Staff*

313. Advanced Topics in Nonlinear and Complex Systems. Prerequisites: Computer Science/Physics 213; recommended: Physics 230, 231, and 303 or equivalents. C-L: Computer Science 364. 3 units. *Behringer, Greenside, or Palmer*

315. Quantum Mechanics I. Review of fundamental principles, Dirac notation, operators, eigenvalues and eigenfunctions, nonquantum models, multi-electron atoms, perturbation theory, selection rules, time dependent quantum mechanics, two-level atoms and lasers, Heisenberg equations, path integral approach, symmetry, rotation and angular momentum, tensor operators, Wigner-Eckart theorem, angular momentum recoupling, evaluation of matrix elements. 3 units. *Thomas*

316. Quantum Mechanics II. Quantum physics of systems of many identical particles, symmetrization, anti-symmetrization, scattering theory, Born approximation, WKB approximation, partial wave expansion, optical theorem, quantization of continuous systems, one-dimensional string, electromagnetic field, spontaneous emission, second quantization. Prerequisite: Physics 315. 3 units. *Müller or Thomas*

317. Relativistic Quantum Mechanics. Klein-Gordon equation, Lorentz group, Dirac equation, nonrelativistic limit, hydrogen atom, antiparticles, relativistic fields, gauge invariance, Yang-Mills equation, canonical quantization and particle interpretation of fields, Casimir effect, invariant perturbation theory, Feynman propagator, diagrammatic techniques, scattering matrix, applications to elementary particle reactions. Prerequisite: Physics 316. 3 units. *Müller or Springer*

318. Electromagnetism. Electromagnetic waves, wave optics, wave guides and cavities, radiation, scattering, diffraction, special relativity, and covariant electrodynamics. Prerequisite: Physics 231. 3 units. *Brown or Palmer*

319. Advanced Electrodynamics. Lienard-Wiechart potentials, scattering theory, radiation theory, MHD and plasmas. Prerequisite: Physics 318. 3 units. *Brown*

332. Advanced Quantum Optics. Advanced theory of light-matter interactions. Density matrix and semiclassical Bloch-Maxwell equations, three level laser and nonlinear spectroscopic methods. Superradiance in extended media. Electromagnetic field quantization and radiative damping, master equation approach. Noise and fluctuations, first and second order coherence for classical and quantum fields. Dressed state picture of laser cooling. Prerequisite: Physics 316, 317, 318. 3 units. *Thomas*

333. Electronic Properties of Submicron Solid-State Devices. Prerequisite: quantum mechanics. See C-L: Electrical Engineering 312. 3 units. *Stroschio*

341. Quantum Field Theory. Path integral quantization, generating functional for Green functions, quantization of gauge fields, perturbative formulations, spontaneous symmetry breaking, Goldstone theorem, Higgs-Kibble mechanism, operator product expansion, renormalization group, anomalies, semiclassical methods, solitons and instantons. Prerequisite: Physics 317. 3 units. *Staff*

346. Topics in Theoretical Physics. Weak interactions and QCD. Calculations in nuclear and particle physics using the standard model of weak interactions and QCD. Perturbative QCD and renormalization groups. Chiral theories. For high energy and nuclear experimentalists and theorists. Prerequisite: Physics 317. 3 units. *Staff*

351. Physics Research Seminar. Series of weekly presentations on research projects under investigation in the department. No credit. *Staff*

352. Seminar Techniques. Discussion of ways of presenting seminars and participating in follow-on question periods. Each student is required to present at least one seminar on an appropriate research topic. 1 unit. *Meyer*

361. Physics of Free-Electron Lasers. Seminar course on the basic physical mechanisms and effects responsible for emission and amplification of radiation by electron beams moving through transverse fields. Prerequisites: Physics 316 and 319. 3 units. *Madey*

COURSES CURRENTLY UNSCHEDULED

215. Principles of Quantum Theory

240. Computer Applications to Physical Measurement

309. Solid-State Physics I

312. Phase Transitions and Critical Phenomena

334. Atomic Physics and Spectroscopy

335. Molecular Spectroscopy

342. Theory of Elementary Particles.*

345. Advanced High Energy Physics

397, 398. Low Temperature and Solid-State Seminar

Political Science

Professor Aldrich, *Chair* (214-B Perkins); Associate Professor Gillespie, *Director of Graduate Studies* (308 Perkins); Professors Ascher, Barber, Fish, Gao, Holsti, Horowitz, Hough, Keohane, Kitschelt, Kornberg, Lange, Mickiewicz, Paletz, and Spragens; Associate Professors Eldridge, Johns, and McKean; Assistant Professors Archer, Bianco, Brehm, Coles, Feaver, Grant, Gronke, Hamilton, Niou, Orr, Shi, Simmons, and Smith; Professors Emeriti Ball, Braibanti, Cleaveland, Hall, and Leach; Adjunct Professors Kessler and O'Barr

The Department of Political Science offers graduate work leading to the A.M. and Ph.D. degrees. Before being admitted to candidacy for the Ph.D. degree, an applicant must have qualified for the A.M. degree. Instruction is designed to prepare the student for teaching and research, for government service, and for other work related to public affairs. Before undertaking graduate study in political science, a student is ordinarily expected to have completed at least 12 semester hours of course work in political science. Instruction is currently offered in the following fields: American government and politics, comparative government and politics, political theory, and international relations.

The candidate for the degree of Doctor of Philosophy in political science must take at least fifteen courses in all, including twelve in the department, and demonstrate competence in at least two general fields of the discipline as well as in a third general field or in a specialized subfield or in a field external to the department. The candidate must also fulfill a statistics and/or foreign language requirement.

*Offered on demand.

The terminal degree of Master of Arts, for those who do not intend to continue with doctoral studies, is awarded following successful completion of: (1) eight one-semester courses of 3 units each, at least half of which must be in political science; (2) two other courses of 3 units each or 6 units of ungraded research; and (3) either the A.M. thesis or two seminar-length research papers done for Duke courses with a grade of G+ or above (the student will be required to pass an oral exam with either of these options). In addition, candidates for the A.M. degree must demonstrate competence in one foreign language or in statistics.

Further details on the graduate program in political science, the departmental facilities, the staff, and available financial aid may be obtained from the director of graduate studies, Department of Political Science.

For Seniors and Graduates

201S. Problems in International Security (D). Major security issues. Prerequisite: a course in international relations or American foreign policy. 3 units. *Staff*

202. American Foreign Economic Policy (D). Formulation and implementation of American foreign economic policy in the twentieth century. Topics include theories of foreign economic policy-making, commercial and monetary policy, energy and agricultural policies, trade and security, aid to developing countries, management of the debt crisis, foreign investment, the industrial policy debate, and multinational corporations and banks. 3 units. *Simmons*

203S. Issues in Politics and the Media in the United States (A). Research seminar analyzing significant questions in the relationship between politics and the media of communication. Consent of instructor required. 3 units. *Paletz*

205S. The Political Economy of Environmental Resources (B). The rational choice tradition (public goods, collective action, game theory, property rights, new institutionalism) as applied to environmental problems, resource exploitation, environmental justice, and the design of an environmentally sound society. 3 units. *McKean*

207S. American Constitutional Interpretation (A). U.S. Supreme Court interpretation of selected provisions of the Constitution. Prerequisites: Political Science 118 or 127 or 143 and consent of instructor. 3 units. *Fish*

208S. Analyzing the News (A). See C-L: Public Policy Studies 240S. 3 units. *Paletz*

209. Problems in State Government and Politics (A). 3 units. *Staff*

210S. Models in International Relations (D). Emphasis on key theoretical concepts and modeling methodology beginning with basic game theory and decision theory. Such techniques are applied in analysis of deterrence, arms races, balance of power, hegemonic stability, and alliance formation. 3 units. *Niou*

213S. Theories of International Political Economy (D). Comparison and assessment of traditional and modern theories in terms of their logical and empirical validity. 3 units. *Grieco*

216S. Evolution of European Marxism (C-N). The central themes in the evolution of European Marxism: socialist thought prior to Marx; the writings of Marx and Engels. The themes are articulated in: Russian Marxism; Soviet Communism and its Marxist critics; the rethinking of Marx's political economy, the theory of the state, and concepts of class consciousness in the works of twentieth-century European Marxists. 3 units. *Coles*

217. Comparative and Historical Methods (B). See C-L: Sociology 214. 3 units. *Gereffi, Janoski, Lin, Smith, or Tiryakian*

218. Political Thought in the United States (C-N). American political thought through the Civil War period. The Founders and their European antecedents. Debates over the Constitution, slavery, and the Union. 3 units. *Gillespie or Grant*

220S. Problems in International Politics (D). Prerequisite: one course in international relations, foreign policy, or diplomatic history. 3 units. *Holsti*

222. Introduction to Statistical Analysis (C-E). Basic applications of statistical theory to political questions: research design, hypothesis tests, computer data analysis. Consent of instructor required for undergraduates. 3 units. *Bianco, Brehm, or Gronke*

223. Ancient Political Philosophy (C-N). Intensive analysis of the political philosophy of Plato, Aristotle, and other ancient theorists. C-L: Classical Studies 203. 3 units. *Gillespie or Grant*

224S. Modern Political Theory (C-N). A historical survey and philosophical analysis of political theory from the beginning of the seventeenth to the middle of the nineteenth century. The rise of liberalism, the Age of Enlightenment, the romantic and conservative reaction, idealism, and utilitarianism. 3 units. *Grant or Spragens*

225. Topics in Comparative Government and Politics: Western Europe (B). Topics vary: the development of mass democracy and the welfare state; political and electoral participation and mobilization; social movements and political change; center-periphery conflicts; government and bureaucratic institutions and their relationships to society; the modern welfare state and political economy. 3 units. *Kitschelt or Lange*

227S. Issues in International Communications (B). Research seminar analyzing selected political issues in international communications. 3 units. *Paletz*

228S. Nineteenth- and Twentieth-Century Political Philosophy (C-N). Topics in nineteenth- and twentieth-century political philosophy, considering such authors as Hegel, Marx, Nietzsche, Kant, Fichte, Dostoevsky, and Heidegger. 3 units. *Coles or Gillespie*

229S. Contemporary Theory of Liberal Democracy (C-N). 3 units. *Spragens*

230S. Introduction to Positive Political Theory (C-E). Basic concepts of political economy, theory of preference and choice, social choice theory, and decision and game theory. 3 units. *Aldrich, Bianco, or Niou*

231S. Crisis, Choice, and Change in Advanced Democratic States (B). Contributions of Marx, Weber, and Durkheim toward analysis of modern democracies. Examination of selected contemporary studies using these three perspectives to highlight processes of change and crisis. Unsettling effects of markets upon political systems, consequences of bureaucratic regulation, and transformation of sources of solidarity and integration in modern politics. 3 units. *Kitschelt*

232. Political Economy: Theory and Applications (C-E). Selected topics. 3 units. *Lange*

233. Intermediate Statistical Methods (C-E). Applications of regression models of politics emphasizing the effect of assumptions behind Generalized Least Squares regression. Prerequisite: Political Science 222; consent of instructor required for undergraduates. 3 units. *Bianco, Brehm, or Gronke*

234S. Political Economy of Development: Theories of Change in the Third World (B). Alternative approaches to political economy and social change in the Third World. C-L: Cultural Anthropology 234S, History 234S, and Sociology 234S. 3 units. *Staff*

235S. Comparative Development of Islam (B). Comparative development of Islam in Indonesia, Malaysia, Pakistan, India, North Africa, and sub-Saharan Africa. A com-

parative analysis of the resurgence of Islam as a religious, political, and cultural force. 3 units. *Staff*

236S. Hegel's Political Philosophy (C-N). Within context of Hegel's total philosophy, an examination of his understanding of phenomenology and the phenomenological basis of political institutions and his understanding of Greek and Christian political life. Selections from *Phenomenology*, *Philosophy of History*, and *Philosophy of Right*. 3 units. *Gillespie*

238S. Development of United States Courts of the Fourth Circuit (A). Examines judges, courts, and law of United States district and old circuit courts and Court of Appeals: Maryland, Virginia, West Virginia, North Carolina, South Carolina, 1789-1958. 3 units. *Fish*

239. Comparative History and International Relations (D). Forces central to the practice of politics and international relations. Theoretical perspectives include those of Oswald Spengler, Schumpeter, Marx, Weber, and Aron as well as historical cases such as the Russian Revolution, the world wars, the Depression, and the nuclear era. 3 units. *Staff*

240. American Political Behavior (A). 3 units. *Staff*

244S. The Politics of the European Community (D). Historical, theoretical, and analytical treatment of reform and renewal of the European Community: trade, finance, economic and technological relationships. Impact of European Community development on international relations and American foreign policy. 3 units. *Grieco*

245. Ethics and Policy-Making (C-N). Not open to students who have taken Public Policy Studies 116. See C-L: Public Policy Studies 223. 3 units. *Rapaport*

247. Politics and Philosophy of Self and Other (C-N). Epistemological, ontological, ethical, and political dimensions of relations between self and other. Theorists may include Husserl, Merleau-Ponty, Levinas, Derrida, Adorno, Gadamer, Sartre, Foucault, and Bakhtin. 3 units. *Coles*

248. The Politics of the Policy Process (A). See C-L: Public Policy Studies 219. 3 units. *Ascher, Mayer, or Miller*

249. The Politics of Health Care (A). See C-L: Public Policy Studies 253. 3 units. *Sprinkle*

250S. International Security after the Cold War (D). Contemporary issues in international security: nuclear proliferation, balance of power, the role of force, alternative viewpoints. Consent of instructor required. 3 units. *Fever*

253S. Comparative Government and the Study of Latin America (B). Current literature on major themes of Latin American politics. 3 units. *Archer*

254S. Essential Global Democracy (A). The failure and success in establishing real democracy, including focus on the main leaders. Issues of law, rights, equality, representation, reasoning, and other principles addressed in the context of practical politics. 3 units. *Barber*

255. Political Sociology (B). See C-L: Sociology 255. 3 units. *Smith or Tiryakian*

256S. Arms Control and National Security Policy (D). The evolution of nuclear weapons and strategy and of global defense policy toward the Soviet Union and other adversaries; the arms control process and nonproliferation. Consent of instructor required. 3 units. *Staff*

- 257S. Making American Defense Policy (D).** Theory and practice of politics of national security in the United States. 3 units. *Fawer*
- 258. Global Interdependence.** Historical, cultural, political, economic, and technological factors underlying increasing global interdependence. Different forms interdependence can and has taken. Earlier forms of interdependence and the events that shaped their development and destruction. Topics covered include the transmission of technological innovation and of new diseases as well as the rise of economic regionalism and how modern states have organized their responses. Open to seniors and graduate students including those in the professional schools. 3 units. *Aharoni and staff*
- 260S. The Tradition of Political Inquiry (C-N).** Past and present problems, goals, presuppositions, and methods. 3 units. *Spragens*
- 262S. International Communism (B).** 3 units. *Hough*
- 265S. The Process of International Negotiation (D).** See C-L: Public Policy Studies 265S. 3 units. *Mayer*
- 266S. Comparative Social Policy (B).** See C-L: Public Policy Studies 266S. 3 units. *Smith*
- 267S. Policy-Making in International Organizations (D).** See C-L: Public Policy Studies 267S. 3 units. *Ascher*
- 270S. Fundamentals of Political Economy (C-E).** Application of economic reasoning to the study of politics. Analysis of campaigns and elections; legislatures; and the regulation of industries. C-L: Economics 280S. 3 units. *Aldrich, Bianco, or Niou*
- 272. Chinese Foreign Policy (B).** The formulation and development of Chinese foreign relations and foreign policy since 1949. 3 units. *Shi*
- 274S. Seminar in Urban Politics and Urban Public Policy (A).** A probing of topical issues in both their theoretical antecedents and their contemporary manifestations. The intellectual debates and scholarly treatments surrounding issues of power in the city, urban redevelopment policy, urban poverty, and race in the city. 3 units. *Orr*
- 275. The American Party System (A).** An intensive examination of selected facets of American national political parties, such as relationships between presidential and congressional politics, the politics of national conventions, recent foreign policy and party alignments, and the controversy over party government. 3 units. *Staff*
- 277. Comparative Party Politics (B).** The impact of social and political systems on party structures, functions, ideologies, and leadership recruitment. Emphasis upon research techniques and objectives. 3 units. *Lange*
- 279S. Political Protest and Collective Mobilization (B).** Survey of theories, methods, and empirical studies of political mobilization outside institutional channels; protest behavior and strategies; responses of the state to these challenges; the success of collective mobilization. Emphasis on comparative analyses of protest in advanced industrial democracies. 3 units. *Kitschelt*
- 282S. Canada (B).** See C-L: History 282S; also C-L: Cultural Anthropology 282S, Economics 282S, and Sociology 282S. 3 units. *Staff*
- 284S. Public Policy Process in Developing Countries (B).** See C-L: Public Policy Studies 284S. 3 units. *Ascher*
- 299. Advanced Topics in Government and Politics.** Topics vary from semester to semester. A. American Government and Politics B. Comparative Government and Politics C. Political Theory D. International Relations 3 units. *Staff*

For Graduates

303. Seminar on Statistics. Application of advanced statistical methods to political science research problems. Primary focus on multiple regression procedures. Emphasis on assumptions, interpretation of results, and use of the computer. Consent of instructor required. 3 units. *Staff*

304. Classes in American Politics (A). Introduction to fundamental research and theoretic statements in American politics. 3 units. *Aldrich, Bianco, Brehm, or Paletz*

305. Seminar in United States Foreign Policy. Decision making in American foreign policy. The sources, substance, and consequences of United States policy will be examined. The emphasis is on the period since 1945. 3 units. *Holsti*

306. Public Opinion (A). Intensive study of the causes and consequences of public attitudes toward politics, with special attention given to recent research in the field. 3 units. *Brehm or Gronke*

307. Formal Modeling in Political Science. Introduction to formal analysis of recent work in political science. Focus on a number of important theorems and their proofs drawn from such areas as bargaining, deterrence, public goods, collective choice, electoral politics, and new institutionalism. Students will in the process be expected to begin work on formal proofs of their own. Prerequisite: one course in game theory. 3 units. *Niou*

308. Individual Research. Students will conduct research designed to evaluate hypotheses of their choice. Reports on the research must be presented in appropriate professional style. 3 units. *Staff*

309. Seminar in International Relations. Critical survey of theories and research in international relations and foreign policy. Emphasis will be placed on the interrelation between theory and research. 3 units. *Holsti*

310. Scope and Methods in Political Science. Designed to explore philosophical assumptions in political science, theory, and matters of evidence and judgment, the course is meant to be an introduction to variations in research design, empirical methods, and the execution of research. 3 units. *Staff*

312. Electoral Behavior (A). Survey of major themes and controversies in electoral behavior research. Aggregate and individual level analyses of elections; historical and contemporary trends in voting behavior. 3 units. *Gronke*

313. Seminar in Political Communications. A field survey with emphasis on politics and media in the United States. 3 units. *Paletz*

315. Noncooperative Game Theory. See C-L: Economics 315; also C-L: Statistics 386. 3 units. *Meurer or Moulin*

317. The New Institutionalism in Political Science. Survey of recent developments in information economics, theory of the firm, the property rights paradigm, and contract theory. Emphasis on using these techniques to answer classic questions in political science. 3 units. *Bianco*

320. Political Psychology. Examination of the human political situation through the study of actual problems and solutions at the level of: (1) the individual, (2) political discourse among government officials, (3) public discourse in the media. 3 units. *Barber*

321. Seminar in Political Theory. Prerequisite: 6 units in political science elected from 223, 224, 229, 231, or their equivalents. 3 units. *Staff*

322. Topics in Early Modern Political Thought. Selected readings from political thinkers ranging from Machiavelli to Mill. 3 units. *Grant or Spragens*

324. Seminar in Comparative Politics (A). A field survey with emphasis on the politics of developing areas. Note: it is generally expected that political science graduate students taking comparative politics as a preliminary field will take both this course and Political Science 325. 3 units. *Staff*

325. Seminar in Comparative Politics (B). A field survey with emphasis on the politics of advanced industrial democracies. Note: it is generally expected that political science graduate students taking comparative politics as a preliminary field will take both this course and Political Science 324. 3 units. *Staff*

326. Research Seminar in Comparative Government and Politics. Seminar in major issues in comparative politics and intensive individual student research projects. 3 units. *Staff*

327. Comparative Political Behavior. This seminar critically examines research on variations in elite and mass behavior as well as the conditions affecting that behavior in a variety of Western countries. 3 units. *Kornberg*

332. Seminar on Political Economy: Micro Level. Survey of recent work in political science and economics on the organization of institutions: political, sociological, and economic. Focus upon the ways in which rational choice theory is applied to areas outside of economics. 3 units. *Staff*

333. Seminar in Political Economy: Macro Level. Survey and analysis of recent work in political science, economics and sociology on the relationships between states and markets. Special emphasis on the ways states influence market outcomes and the ways the organization of power in markets influences state behavior, especially in democratic systems. 3 units. *Lange*

340. Seminar in American Politics and Institutions. Survey, analysis, and critique of the literature. 3 units. *Paletz or staff*

341. Legislative Politics. Survey of current research on the legislative branch of government. Topics include: elections, committee systems, oversight, party organizations, and others. 3 units. *Bianco*

351. Comparative Law and Politics: Ethnic Group Relations (B). Various approaches to the reduction of conflict in deeply divided societies, primarily in Asia and Africa, with secondary attention to Western countries. The nature of ethnic identity, the sources of group conflict, and the forms and patterns it takes. Methods of analyzing social science materials and utilizing them for the design of politics, laws, and institutions. Consent of instructor required. 3 units. *Horowitz*

381. Research Seminar in Latin American Government and Politics. Prerequisite: Political Science 253 or equivalent. 3 units. *Staff*

390. Research Seminar in International Relations. Prerequisite: Political Science 226, Political Science 309 or equivalent. 3 units. *Holsti*

397. Selected Topics in Government and Politics. Topics vary from semester to semester. 2 units. *Staff*

398. Selected Topics in Government and Politics. Topics vary from semester to semester. 3 units. *Staff*

COURSES CURRENTLY UNSCHEDULED

204S. Ethics in Political Life (C-N)

- 211S. Current Problems and Issues in Japanese Politics (B)
- 212S. Domestic Structures and Foreign Policies of Advanced Democratic States (D)
- 214S. The Politics of Scarcity (B)
- 215S. Philosophical Bases of Political Economy and Society (C-E)
- 219S. Film and Politics (A)
- 221S. International Institutions and the World Political Economy (D)
- 226S. Theories of International Relations (D)
- 237S. Comparative Public Policy (B)
- 241S. The Political Thought of Asia from Manu to Mao (C-N)
- 243S. Political Applications of Game Theory (C-E)
- 246S. Political Hypocrisy and Idealism (C-N)
- 251S. The American Presidency (A)
- 252S. The Nation-State and the International System (D)
- 259S. Low Intensity Conflict and the Lessons of Viet Nam (D)
- 261. Politics and the Future (D)
- 263S. Methods of Political Science (C-E)
- 264S. Feminist Theory and the Social Sciences (C-N)
- 268. The Regulatory Process (A)
- 280S. Comparative Government and Politics: Sub-Saharan Africa (B)
- 283S. Congressional Policy-Making (A)
- 293. Federalism (B)
- 360. Seminar in Government and Politics in the Soviet Union

RELATED COURSE WORK IN THE SCHOOL OF LAW

It is possible to receive graduate credit for course work completed in the Duke University School of Law, under regulations referred to in this bulletin under the section on academic regulations.

Psychology: Experimental

Professor Lockhead, *Chair* (224 Sociology-Psychology); Professor Eckerman, *Director of Graduate Studies*; Professors Bettman, C. Erickson, R. Erickson, W. C. Hall, W. G. Hall, Hasher, Holland, Marsh, Palmer, Payne, Rubin, S. Schiffman, Staddon, and M. Wallach; Associate Professors Meck, Putallaz, Schmajuk, and Williams; Assistant Professors Mazuka, Needham, and Nowicki; Research Professors Crovitz and L. Wallach; Professors Emeriti Diamond, Kimble, Kremen, H. Schiffman, and Wing

The department offers graduate work leading to the Ph.D. degree. The areas of concentration are cognitive and sensory sciences, psychobiology and behavioral neuroscience, and developmental psychology. Graduate training in developmental psychology is a collaborative effort with the Department of Psychology: Social and Health Sciences. A brochure is available from the director of graduate studies which describes

training in each area in more detail and gives information on financial assistance, facilities, and current research activities. The department has no foreign language requirement.

For Seniors and Graduates

202S. Autobiographical Memory. A review and critical analysis of the literature, theory, and empirical study of autobiographical memory within cognitive psychology. 3 units. *Rubin*

203S. Sensation and Perception. Classical and current concepts and methods. 3 units. *Lockhead*

205S. Children's Peer Relations. Consent of instructor required. See C-L: Psychology: Social and Health Sciences 205S. 3 units. *Putallaz*

209S. The Cognitive Psychology of Oral Traditions. The structure of songs and genres from oral traditions and the processes used in their composition, transmission, and recall, analyzed from the perspective of cognitive psychology. 3 units. *Rubin*

210S. Cognition. Schematic view of cognitive psychology plus intensive study of two to three specific research topics such as forms of representation, individual differences, and problem-solving models. Emphasis on alternative experimental and theoretical approaches. Prerequisite: Psychology 107 or graduate status. 3 units. *Day*

212S. Human Memory. Classical and modern literature, data, and theories relating to mechanisms of information processing, storage, and retrieval. 3 units. *Hasher or Rubin*

214S. Development of Social Interaction. Major concepts and methods pertaining to early social development, emphasizing human social behavior and a developmental psychobiological approach. C-L: Psychology: Social and Health Sciences 214S. 3 units. *Eckerman*

220S. Psycholinguistics. Selected topics such as neurolinguistics, linguistic versus pictorial representation, individual differences, oral versus written expression, language and personality, and the language-thought interaction. Prerequisites: Psychology 134 and consent of instructor or graduate status. 3 units. *Day*

222. Behavioral and Neural Modeling. The nervous system as controller of adaptive behavior. Basic facts and principles of perception, learning, and memory. Theory of neural networks. Formal networks as models for behavior and neural systems. C-L: Neurobiology 222. 3 units. *Staddon and staff*

230S. Social Behavior of Animals. Developmental, ecological, and physiological aspects of territorial, sexual, parental, and aggressive behavior. Consent of instructor required. 3 units. *C. Erickson*

234S. Advanced Personality. Selected topics of current interest concerning empirical research on personality. Strategies for the definition of research questions and the evaluation of research progress. Consent of instructor required. C-L: Psychology: Social and Health Sciences 234S. 3 units. *M. Wallach*

261S. Advanced Learning Theory. Selected topics in the data and theory of basic processes of learning, memory, and motivation in animals and humans. Emphasis on the nature of theory construction and evaluation, and the relation of current perspectives to older ones. Prerequisite: graduate status. 3 units. *Holland*

270S, A-R, U-Z. Selected Problems. 3 units. *Staff*

For Graduates

315. Seminar in Consumer Behavior. See C-L: Business Administration 562; also C-L: Psychology: Social and Health Sciences 315. 3 units. *Bettman*

316. Behavioral Decision Theory. See C-L: Business Administration 525; also C-L: Psychology: Social and Health Sciences 316. 3 units. *Payne*

329-330. Proseminar in Psychology. A historically oriented, team-taught course introducing graduate students to important ideas and discoveries in scientific psychology. 6 units. *Staff*

332. Developmental Psychopathology. See C-L: Psychology: Social and Health Sciences 332. 3 units. *Lochman and Thompson*

349-350. Practicum in Psychological Research. 6 units. *Staff*

352. Child Assessment. See C-L: Psychology: Social and Health Sciences 352. 3 units. *Coie and Putallaz*

396. Graded Research. 1 to 3 units. Variable credit. *Staff*

398. Special Readings in Psychology. 3 units. *Staff*

COURSES CURRENTLY UNSCHEDULED

215S. Cognitive Development

219S. Physiological Foundations of Psychology

266S. Comparative Neurobiology

309. Seminar in Learning

310. Seminar in Perception

337. Seminar in Sensory Discrimination

Psychology: Social and Health Sciences

Professor Costanzo, *Chair*; Professor Roth, *Director of Graduate Studies*; Professor Craighead, *Director of Clinical Training*; Professors Bettman, Blumenthal, Brodie, Carson, Coie, Eckerman, George, Hamilton, Hasher, Martin Lakin, Maddox, Payne, Surwit, Thompson, Vidmar, M. Wallach, Weiss, and Williams; Associate Professors Anderson, Curry, Keefe, Linville, Lochman, Logue, Putallaz, Sheppard, and Spenner; Assistant Professors Emery, Fischer, Fredrickson, Gil, and Mazuka; Professors Emeriti Alexander, Borstelmann, and H. Schiffman; Assistant Professors of the Practice Musia Lakin and Terry; Research Professor Goldstein; Adjunct Professor L. Wallach; Assistant Research Professor Madden; Research Scholar Fairbank

The department offers graduate work leading to the Ph.D. degree in psychology. The program faculty listed above are each members of the department, however, some have their primary appointment in other units of the University including the Business School, Law School, and Medical School. Concentrations of Ph.D. study are: clinical (including developmental psychopathology, adult, and health tracks); human cognition; personality/social; and social and applied developmental psychology. There is particular interest in the conjunction between basic perspectives in psychology and their applied and policy-related derivatives. In addition, the department collaborates with the Department of Psychology: Experimental in the conduct of a Ph.D. concentration in developmental psychology. A brochure is available from the Director of Graduate Studies which describes the programs in more detail and gives information on financial

assistance, facilities, and current research activities. The department has no foreign language requirement.

For Seniors and Graduates

205S. Children's Peer Relations. An examination of the empirical literature with emphasis on the functions that peers serve for children, the developmental course of these relationships, the clinical ramifications and possible explanations for inadequate peer relations (including an examination of the family's role), and interventions used to improve children's relationships with their peers. Consent of instructor required. C-L: Psychology: Experimental 205S. 3 units. *Putallaz*

206S. Pediatric Psychology. The conceptual and methodological bases for the field. Case material illustrating how developmental, biological, and psychosocial processes act together in child health and illness. Focus on adjustment and coping with illness and treatments related to cystic fibrosis, sickle cell disease, cancer, diabetes, and seizure disorders. Consent of instructor required. 3 units. *Thompson*

207S. Topics in Psychobiology. The biological substrates of human behavior in health and disease. Drug abuse, alcoholism, depression, schizophrenia, and human aggression. Films and videotapes. Student presentations; patient interviews. 3 units. *Brodie*

208S. Emotion. An analysis of theoretical and empirical approaches to understanding emotions, with an emphasis on the functions emotion serves in people's lives. Both classic and contemporary research literatures. Prerequisite: graduate status. C-L: Women's Studies. 3 units. *Fredrickson*

214S. Development of Social Interaction. See C-L: Psychology: Experimental 214S. 3 units. *Eckerman*

217S. Advanced Social Psychology. The psychology of interpersonal influence and control; the cognitive and social factors affecting the perception of persons and social action; the dynamics of interpersonal relations and relationship formation and change; the contribution of individual differences to social behavior. Applications in environmental psychology, social psychology and law, and organizational psychology. 3 units. *Costanzo*

218S. Personality, Stress, and Disease. The interaction between person and social environment as a contributor to development of physical disease. Both epidemiological and laboratory-based research considered. Prerequisite: Psychology 109, consent of instructor, or graduate status. 3 units. *Williams*

227S. Behavioral Physiology: Basic Systems. Organ systems review of physiology, emphasizing the role of the central nervous system and behavior in physiological function. 3 units. *Surwit*

228S. Behavioral Physiology: Stress and Disease. Physiological processes involved in stress and coping; effects on nervous, cardiovascular, immune, and endocrine systems; how stress influences various disorders, that is, depression, cardiovascular disease, and diabetes. 3 units. *Surwit*

234S. Advanced Personality. Consent of instructor required. See C-L: Psychology: Experimental 234S. 3 units. *M. Wallach*

255S-256S. Life-Span Development I and II. Behavioral and psychological development. 255S: the origins and course of cognitive and emotional development (including language, memory, achievement, affective regulation of behavioral process). 256S: components of personality and social development (including attachment relations, self

esteem, social interactive process, moral development). Broad issues in the interrelationships of environmental context and individual phenomenon in the emergence of these processes. Longitudinal and cross-sectional approaches to the empirical examination of life course phenomenon. Applications to models of both normative and pathological development. 6 units. *Costanzo, Goldstein, and staff*

262S. Minority Mental Health: Issues in Theory, Treatment, and Research. Survey and discussion of theoretical, research, and clinical issues in minority mental health with special emphasis on African-Americans. 3 units. *Anderson*

264S. Gender, Hormones, and Health. Hormone effects on behavior in animals and humans with topics including pubertal, menstrual-cycle, sex-related, and gender-related effects on mood, behavior, cognition, and health. C-L: Women's Studies. 3 units. *Hamilton*

271S, A-R, U-Z. Selected Problems. 3 units. *Staff*

273. Statistics I. Foundations of probability and statistical inference. Introduction to the general linear model via multiple regression. Emphasis on application via statistical computing with SAS. Consent of instructor required. 3 units. *Terry*

274. Statistics II. Basic and advanced ANOVA models via the GLM. Broad-based overview of multivariate models, including MANOVA, canonical correlation, discriminant analysis, and factor analytic models. Emphasis on application and use of computer packages. Prerequisites: Psychology: Social and Health Sciences 273 or consent of instructor. 3 units. *Terry*

280S. History and Systems of Psychology. The birth, course, present, and future of psychology from the ancient philosophers to neural networks and neuroanatomy. 3 units. *Serra*

288S. Advanced Topics in Social Science and Law. Study of one broad domain in social science and law; exact content area to vary by semester. Emphasizes how empirical findings in social science are translated and used by the legal system. Possible areas include women's legal issues, family violence, expert testimony, employment discrimination. Prerequisite: graduate status. 3 units. *Fischer*

289S. Psychology of Prevention. Concepts of prevention and mental health promotion; community psychology and social systems; epidemiology and prediction of disorder; intervention strategies; evaluation of prevention trials; and ethical and cultural issues. 3 units. *Coie*

For Graduates

301. Group Psychotherapy and Group Influence Processes. Theories of group interventions and group techniques. 3 units. *Lakin*

302. Personality Theory. An advanced course in the representative theories of human functioning, from Freud to contemporary approaches. 3 units. *Staff*

304-305. Personality and Psychopathology, I and II. Semester one considers perspectives and fundamental principles in the study of personality. Semester two is devoted to the implications of these principles for psychopathology and behavior disorders and for the classification of abnormal behavior. 6 units. *Staff*

307. Models of Intervention and Prevention. Concepts of prevention and mental health promotion; community psychology and social systems; epidemiology and prediction of disorder; intervention strategies; evaluation of prevention trials; and ethical and cultural issues. Specific approaches to psychotherapy and psychoeducational therapy will be discussed in relation to the prevention-intervention continuum. 3 units. *Staff*

311-312. Introduction to Psychology: Social and Health Sciences. A problem-centered introduction to contemporary scientific and professional issues in human psychology. Multiple perspectives on theoretical, empirical, ethical, and professional considerations addressed in both lecture and discussion formats. No credit. *Costanzo and Craighead*

315. Seminar in Consumer Behavior. See C-L: Business Administration 562; also C-L: Psychology: Experimental 315. 3 units. *Bettman*

316. Behavioral Decision Theory. See C-L: Business Administration 525; also C-L: Psychology: Experimental 316. 3 units. *Payne*

318. Research Design. Examines the foundations of psychological and scientific inquiry. Emphasis is on applications that are likely to be encountered by the research psychologist. Prerequisite: advanced graduate-level statistics course or equivalent. 3 units. *Terry*

323, 324. Seminar in Community Psychology. An examination of the organization and functioning of community systems and an exploration of factors involved in system changes through psychologically based intervention strategies. On-line experiences with school system consultation will provide a primary basis for study. 3 units each. *Alexander or Costanzo*

332. Developmental Psychopathology. Consideration of major psychopathological disorders in childhood and adolescence, theories and research on etiology and prediction of disorder. C-L: Psychology: Experimental 332. 3 units. *Lochman and Thompson*

335-336. Personality Assessment. First semester: personality assessment through interviews and the study of personal documents. Second semester: personality assessment through the study of formal tests, objective and projective. 6 units. *Alexander*

339. Ethics for Psychotherapists. A course for graduate students in the clinical program. 3 units. *Lakin*

343-344. Clinical Practicum. Intensive experience and supervision in clinical intervention processes. Student training in psychotherapy strategies and techniques and in clinical consultation skills is conducted in clinical settings. 0 to 6 units. Variable credit. *Staff*

348. Psychotherapy with Children and Families. Major theoretical approaches to clinical intervention with children and adolescents, either individually or in the family system context. 3 units. *Coie*

352. Child Assessment. Interview methods; intelligence and achievement testing; personality and developmental batteries; peer, teacher, and parental instruments; and observational techniques. C-L: Psychology: Experimental 352. 3 units. *Coie and Putallaz*

353. Research Practicum in Prevention. Students will be involved in a short-term research apprenticeship to a faculty member other than their mentor for hands-on experience with research efforts pertinent to the prevention of illness. 3 units. *Staff*

355-356. Research Practicum. Students will be involved in a research apprenticeship to a faculty member for hands-on experience with research efforts. 6 units. *Staff*

397. Graded Research. 1 to 3 units. Variable credit. *Staff*

399. Special Readings in Psychology. 3 units. *Staff*

COURSES CURRENTLY UNSCHEDULED

215S. Cognitive Development

284S. Feminist Theory and the Social Sciences

Public Policy Studies

Professor Ascher, *Chair* (124 Public Policy Studies Building); Professor Ladd, *Director of Graduate Studies* (214A Public Policy Studies Building); Professors Ascher, Barber (political science), Behn, Clotfelter, Cook, Fleishman (law), Garson (pediatrics and medicine), Healy (environment), Hough (political science), Kuniholm, Magat (business), Mickiewicz, Pearsall (engineering), and Price (political science); Associate Professors Conrad, Leitzel, Lipscomb, McConahay, and Rapaport; Assistant Professors Gentry (economics), Hamilton, Mayer, Miranda, Smith, and Sprinkle (health policy and pediatrics); Professors of the Practice Boothby, Broder, Harris, and Stubbing; Adjunct Professor Yaggy; Visiting Associate Professor McElroy; Visiting Assistant Professors Korstad, Miller, and Ramachandran; Senior Research Scientist Vaupel; Lecturer Payne; Visiting Lecturers Ammarell and Lin

The graduate program in public policy studies is offered through the Terry Sanford Institute of Public Policy. The objective of the program is to prepare students for jobs, particularly in the public sector, which require analytical skills and a practical understanding of the processes by which policy is made and implemented.

The Master of Public Policy (M.P.P.) degree requires two academic years and a summer internship. The first year is devoted to core courses in policy analysis, including sequences in quantitative methods, economics, political analysis, and ethics. The summer internship is arranged with a federal, state, or local agency of government, a not-for-profit organization, or business. The second-year curriculum includes course work in public management and macroeconomics, electives in substantive policy areas, and a master's "memo" to be researched and written on a problem of current policy concern.

Students who are concurrently enrolled in a Ph.D. program or a professional degree program (M.D., J.D., M.B.A., etc.), or who have already obtained such a degree, can apply for an abbreviated version of the M.P.P. program. Such students are excused from most second-year requirements, so ordinarily the M.P.P. can be completed in one additional year. Students usually apply for a joint degree program simultaneously with their applications to the graduate departments or professional schools, or during their first or second year of advanced study.

In addition to the M.P.P., the Sanford Institute offers the Program in International Development Policy (PIDP), which provides from one semester to two years of training in policy analysis and problems related to sustainable economic development. The PIDP is designed for mid-career professionals with at least five years of experience in a development-related field. For more information, please contact the Sanford Institute's Center for International Development Research, Duke University, Box 90237, Durham, North Carolina 27708.

The institute does not award a Ph.D.

More information concerning the M.P.P. programs can be obtained by writing the director of graduate studies.

For Seniors and Graduates

216S. Economics of Education. Prerequisite: Economics 149 or Public Policy Studies 110. See C-L: Economics 216S. 3 units. *Clotfelter*

217. Microeconomics and Public Policy-Making. Consumption and production theory, welfare economics, theories of collective choice, market structures and regulation, and nonmarket decision making. Not open to students who have taken Public Policy Studies 110. 3 units. *Clotfelter or Ladd*

218. Macroeconomic Policy. Survey of macroeconomic theory and analysis of policies designed to reduce unemployment, stimulate economic growth, and stabilize

prices. Conventional monetary and fiscal instruments, employment policies, and new policies designed to combat inflation. C-L: Economics 218. 3 units. *Leitzel or McElroy*

219. The Politics of the Policy Process. The formulation of public policies, substantive policies in a variety of contexts from local government to international affairs; the role of legislatures, interest groups, chief executives, and the bureaucracy in defining alternatives and in shaping policy from agenda formulation to implementation. Not open to students who have taken Public Policy Studies 114. C-L: Political Science 248. 3 units. *Ascher, Mayer, or Miller*

222. Statistics and Data Analysis for Policymakers. Not open to students who have had Mathematics 136 or Statistics 110A, 110B, 112, 113, 114, 210B, or 213. See C-L: Statistics 210A. 3 units. *Staff*

223. Ethics and Policy-Making. Normative concepts in politics, liberty, justice, and the public interest: historical and philosophical roots, relationship to one another and to American political tradition, and implications for domestic and international problems. Not open to students who have taken Public Policy Studies 116. C-L: Political Science 245. 3 units. *Rapaport*

231. Quantitative Evaluation Methods. Problems in quantifying policy target variables such as unemployment, crime, and poverty. Experimental and nonexperimental methods for evaluating the effect of public programs, including topics in experimental design, regression analysis, and simulation. Prerequisite: Public Policy Studies 222 or equivalent. 3 units. *Cook or McConahay*

232. Microeconomics: Policy Applications. Cost benefit analysis of public programs. Public utility regulation, pollution regulation, hospital rate setting, regulation of product safety. Quantitative methods and microeconomic theory for analysis of both normative and positive aspects of economic policy. Prerequisites: Public Policy Studies 110 or 217 or Economics 149 and familiarity with regression analysis or concurrent enrollment in Public Policy Studies 231. C-L: Economics 232. 3 units. *Conrad or Ladd*

236. Public Management I: Managing Public Agencies. Operations management, information and performance, personnel management, public sector marketing. 3 units. *Behn or Yaggy*

238. Public Budgeting and Financial Management. Fund accounting for government; techniques of financial analysis, including break-even analysis, cost accounting, cash-flow analysis, and capital budgeting; and governmental budgeting, including the budgetary process and reforms, and the budget crunch in the public sector. 3 units. *Stubbing*

240S. Analyzing the News. Research seminar on political messages and effects of media. Methods and findings of content analysis, survey research, critical theory, semiology; research project integrating these approaches. C-L: Political Science 208S. 3 units. *Paletz*

241. Reporting the American People. Critical analysis of the sources of information the media rely upon in reporting opinion and policy preferences: opinion polls, bellwethers, informed elites. Includes the design and execution of a public opinion poll on a topic of local or national interest. 3 units. *McConahay*

251S. Regulation of Vice and Substance Abuse. Focus on activities that have traditionally been defined as vices (including drinking, smoking, use of opiates, gambling, pornography, prostitution) and the problems of regulating and controlling them in a free society. Evaluation of social costs and benefits of various alternative policy interventions. Prerequisite: Economics 149 or Public Policy Studies 110. C-L: Economics 251S. 3 units. *Cook*

253. The Politics of Health Care. The history, status, and future of health care policy. Grounded in political theories such as distributive justice, altruism, and contractarianism. Focus on policy formation. Case discussions of American reform controversies in light of international experience. C-L: Political Science 249. 3 units. *Sprinkle*

255. Health Policy Analysis. Group analysis of a current health-policy problem. Project involves background research, data acquisition, analysis, writing, and presentation of a substantial policy report. Designed for candidates seeking the undergraduate certificate in health policy. Consent of instructor required. 3 units. *Boychuk*

256. The Economics of Health Care. The health care industry and government policies designed to alter market demand and supply relationships: national health insurance, the relationship between insurance, supply constraints, and inflation; the supply and distribution of health manpower; hospital cost containment policy. Prerequisite: Economics 149 or the equivalent or consent of instructor. 3 units. *Lipscomb*

257. United States Policy in the Middle East. From World War II to the present with a focus on current policy options. 3 units. *Kuniholm*

259S. State and Local Public Finance. Analysis of state and local revenue sources, intergovernmental fiscal relations, budgets and expenditures, fiscal aspects of economic development, and the municipal bond market. Policy topics include financing schools and transportation systems, tax policy, and current fiscal issues. Prerequisite: Public Policy Studies 217 or equivalent. C-L: Economics 259S. 3 units. *Ladd*

260. Economic Policy Analysis of Nonrenewable Resources. Economic analysis of nonrenewable resources, development, and exploration. Relationship between natural resources and other economic sectors. Emphasis on public policy tax and regulatory policy, natural resources in developing economies and foreign investment in the mining sector. Prerequisite: Economics 149, Public Policy Studies 110, or Public Policy Studies 232. C-L: Economics 260. 3 units. *Conrad*

261. Evaluation of Public Expenditures. Basic development of cost benefit analysis from alternative points of view, for example, equity debt, and economy as a whole. Techniques include: construction of cash flows, alternative investment rules, inflation adjustments, optimal timing and duration of projects, private and social pricing. Adjustments for economic distortions, foreign exchange adjustments, risk and income distribution examined in the context of present value rules. Examples and cases from both developed and developing countries. C-L: Economics 261 and Environment 272. 3 units. *Conrad*

262S. Seminar in Applied Project Evaluation. Initiate, develop, and perform a project evaluation. Range of topics include measuring the social cost of deforestation, the B1 Bomber, a child nutrition program, the local arts program. Prerequisite: Economics 285 or Public Policy Studies 261. C-L: Economics 262S. 3 units. *Conrad*

264S. Research Seminar: Topics in Public Policy I. Selected topics. 3 units. *Staff*

265S. The Process of International Negotiation. Negotiations between governments or between international institutions and governments. Explorations of historic cases, such as the U.S.-Canada Free Trade Negotiation, the INF Talks, and Camp David Summit. C-L: Political Science 265S. 3 units. *Mayer*

266S. Comparative Social Policy. An emphasis on advanced industrial countries. The seminar will explore the relationship between political process and public policy by making cross-national comparisons; introduce the major policy questions in the field of social policy; and provide students with some knowledge of the substance of social policy in different countries. C-L: Political Science 266S. 3 units. *Smith*

267S. Policy-Making in International Organizations. Emphasis on international financial institutions such as the World Bank and the International Monetary Fund. C-L: Political Science 267S. 3 units. *Ascher*

271S. Schools and Social Policy. Public schools as instruments of public policy. Economic and statistical analysis of the educational production process. Consideration of alternative school reforms. 3 units. *Clotfelter*

272L. Resource and Environmental Economics. Includes laboratory. Prerequisite: introductory course in microeconomics. See C-L: Environment 270L; also C-L: Economics 270L. 4 units. *Kramer*

274. Resource and Environmental Policy. Development of a policy analysis framework for studying resource and environmental policy. Political institutions, interest group theory, public choice theory, role of economics in policy analysis, ethics and values. Application to current and historical U.S. policy issues. Prerequisite: Environment 270L, Public Policy Studies 272, or consent of instructor. C-L: Environment 274. 3 units. *Healy*

284S. Public Policy Process in Developing Countries. Policy-making patterns in less developed countries; examples from Latin America, Africa, and Asia. C-L: Political Science 284S. 3 units. *Ascher*

285. Land Use Principles and Policy. Consideration of four major roles of land in the United States: as a producer of commodities, financial asset, component of environmental systems, and location of development. Analysis of market allocation of land, market failure, role of public planning and regulation. C-L: Environment 285. 3 units. *Healy*

286S. Economic Policy-Making in Developing Countries. Fiscal, monetary, and exchange rate policies in less developed countries; issues in public policy toward natural resources and state-owned enterprises. Prerequisite: Economics 149 or Public Policy Studies 110. C-L: Economics 286S. 3 units. *Conrad or Ramachandran*

288S. Current Issues in United States Federal Tax Policy. Prerequisite: Economics 149 or consent of instructor. See C-L: Economics 288S. 3 units. *Gentry*

For Graduates

303. Public Policy Workshop I. Introduction to policy analysis and advising. Emphasis on written and oral communication skills, the substance of public policies, and the role of policy analysts. Open to Public Policy Studies M.P.P. students only. 3 units. *Staff*

304. Public Policy Workshop II. The role and influence of policy analysis. The examination of specific public policy cases and recommendations for action. Emphasis on written and oral communications skills. Open to Public Policy Studies M.P.P. students only. 3 units. *Staff*

305. Public Policy Workshop III. Emphasis on individual or group projects. Preparation for Master's Memo. Open to Public Policy Studies M.P.P. students only. 3 units. *Yaggy*

306S. Special Topics in Public Policy. Selected topics. Prerequisite: graduate level. 3 units. *Staff*

325S, 326S, A-F. Program in International Development Policy Sector Seminar. Exploration of the relationships among sectoral policies and sustainable development in less developed countries, with emphasis on a particular sector each year. Open only to Program in International Development Policy Fellows, or by consent of instructor.

- A. Urban and Rural Development in Developing Countries
 - B. Natural Resources and Environmental Policy-making
 - C. Urban Environmental Issues in Developing Countries
 - D. Restructuring the Energy Sector in Developing Countries
 - E. Privatization and the Role of the State in Development
 - F. Central American Resource and Environmental Policy
- Variable credit. *Staff*

327S, 328S, A-F. Program in International Development Policy Issue Seminar. Topics in policy issues and institutional structures of sectoral policy-making in less developed countries. Open only to fellows of the Program in International Development Policy, or by consent of instructor.

- A. Appropriate Technology and Technology Transfer
 - B. Economic Analysis of Nonrenewable Resources
 - C. Multinational Investment in Developing Countries
 - D. Technology Transfer and Foreign Aid to Developing Countries
 - E. Structural Adjustment and Poverty
 - F. Economic Analysis of Development
- Variable credit. *Staff*

388. Research Tutorial in Public Policy. 3 units. *Staff*

399. Special Readings in Public Policy Studies. 3 units. *Staff*

COURSES CURRENTLY UNSCHEDULED

- 204S. Ethics in Political Life
- 221. Decision Analysis for Public Policymakers
- 237. Public Management II: Managing Public Agencies
- 245S. Leadership Tutorial
- 250S. Policy, Philanthropy, and the Arts
- 252S. United States Strategic Arms Policy
- 254. Transportation Planning and Policy Analysis
- 269. The Regulatory Process
- 270S. Humanistic Perspectives on Public Policy
- 278. Human Service Bureaucracies
- 283S. Congressional Policy-Making

Religion

Professor Hillerbrand, *Chair* (123A Gray); Professor Clark, *Director of Graduate Studies* (209A Divinity School); Professors D. Campbell, Carroll, Crenshaw, Hauerwas, Heitzenrater, Herzog, Kort, Langford, Lawrence, C. Meyers, E. Meyers, Osborn, Richey, E. Sanders, D. M. Smith, H. Smith, Steinmetz, Wainwright, and Wintermute; Associate Professors Bailey, Berger, Bland, Corless, Hays, Partin, Peters, Surin, and Wacker; Assistant Professors Cornell, Fulkerson, Greggs, Keefe, Martin, and Turner

The Department of Religion offers graduate work in two programs leading to the A.M. and Ph.D. degrees. In Program I, students may major in one of seven fields: (1) Hebrew Bible and Semitics, (2) New Testament and Christian origins, (3) history of Christianity, (4) Christian theology and ethics, (5) history of Judaism, (6) Islamic studies and history of religions, and (7) religion, culture, and critical theory. In addition, students may apply

to Program II, which permits more interdisciplinary work and more courses outside the graduate program in religion. Students will be expected to take courses which will contribute to an adequate understanding of their chosen fields of specialization and will be required to take two written preliminary examinations within their field of concentration. In addition to course work in their major field, students will take such other courses in cognate fields as will contribute to the enrichment of their major studies and will be required to take one written preliminary examination in a single cognate area within the department. A minor requirement may be fulfilled by work in a cognate department, such as classical studies, English, history, literature, philosophy, political science, or sociology, and will constitute the outside minor and material for a fourth written preliminary examination. There is, in addition, an oral examination conducted by the student's committee immediately subsequent to the written examinations. A foreign language requirement of two languages must be met before taking the doctoral preliminary examination.

The program of doctoral studies presumes a foundation in the academic study of religion. Students applying for graduate work in religion directly from an undergraduate program should have had a strong undergraduate major in religion, and will be accepted for the Ph.D. program only upon the satisfactory completion of the A.M. degree with the department.

The graduate program also offers an A.M. degree that is not linked to a specific Ph.D. field. Such study is intended to encourage individuals to pursue a variety of interests irrespective of whether they desire further graduate study. An A.M. concentration may be in any of the seven Ph.D. fields or in an individually designed program of study (such as Islamic studies or religion and the social sciences).

For Seniors and Graduates

201. Studies in Intertestamental Literature. Selected documents of the Apocrypha and Pseudepigrapha examined exegetically and theologically in their relation to post-exilic Judaism. Consent of instructor required. 3 units. *Wintermute*

202. Language and Literature of Dead Sea Scrolls. A study in interpretation. Prerequisite: a knowledge of Hebrew. 3 units. *Wintermute*

203. Studies in American Methodism. Research seminar devoted to selected topics in the Wesleyan and Methodist traditions in America. 3 units. *Richey*

204. Origen. The systematic and apologetic writings of an important Alexandrian thinker and exegete of the third century. 3 units. *Clark*

205. War and the Christian Tradition. An analysis of how Christians have understood and evaluated war, with particular attention to the question of the moral status of war. Works by Augustine, Aquinas, Bainton, Ramsey, Childress, Niebuhr, and Johnson will be considered. 3 units. *Hauerwas*

206. The Christian Mystical Tradition in the Medieval Centuries. Reading and discussion of the writings of medieval Christian mystics (in translation). Each year will offer a special focus, such as: women at prayer; fourteenth-century mystics; and Spanish mystics. Less well-known writers as well as giants will be included. 3 units. *Keefe*

207, 208. Readings from the Hebrew Bible. Grammar with rapid reading of selected passages, both prose and poetry. Prerequisite: at least one year of Hebrew or consent of instructor. C-L: Old Testament 207, 208. 3 units each. *Staff*

209. Old Testament Theology. Studies of the Old Testament in regard to theological themes and content. 3 units. *Crenshaw*

211. Authority in Theology. The idea and function of authority in theology. 3 units. *Fulkerson*

212. Religion: Interpretations and Perspectives. Approaches and methods used for studying religion. Emphasis on the description, explanation, and analysis of such concepts as religion, religious experience, and religious practice. 3 units. *Staff*

213. Christian Ethics in America. Ethical thought in America since Rauschenbush. 3 units. *Hauerwas*

214. Feminist Theology. Examination of feminist theologians and religionists, their critical perspective on the Christian tradition and constructive proposals out of the resources of "female experience." 3 units. *Fulkerson*

216. Syriac. The script and grammar, with readings from the Syriac New Testament and other early Christian documents. Prerequisites: some knowledge of Hebrew and Aramaic. 3 units. *Wintermute*

217. Islam in India. History and thought of major Indian Muslims from Biruni to Wali-Ullah, with special attention to the role of Sufism. An introduction to selected Muslim scholars and saints who contributed to the interaction between Islam and Hinduism in northern India during the second millennium A.D. 3 units. *Lawrence*

218. Religions of East Asia. Shinto, Taoism, Confucianism, and East Asian Buddhism studied phenomenologically in relation to the Axial Age. 3 units. *Corless*

219. Augustine. The religion of the Bishop of Hippo in late antiquity. C-L: Medieval and Renaissance Studies. 3 units. *Clark*

220. Rabbinic Hebrew. Interpretive study of late Hebrew, with readings from the Mishnah and Jewish liturgy. 3 units. *E. Meyers or staff*

221. Readings in Hebrew Biblical Commentaries. Selected Hebrew texts in Midrash Aggadah and other Hebrew commentaries reflecting major trends of classical Jewish exegesis. 3 units. *Bland*

222. John among the Gospels. A consideration of the character, content, and purpose of the Gospel of John in relation to the synoptic and apocryphal gospels. Prerequisite: one year of Hellenistic Greek. 3 units. *M. Smith*

223. A-E. Exegesis of the Hebrew Old Testament.

- A. Pentateuch
 - B. Historical Books
 - C. Major Prophets
 - D. Minor Prophets
 - E. Writings
- 3 units. *Staff*

224A. Comparative Semitic I. An introduction to the morphology and syntax of classical Ethiopic and the Semitic languages of Mesopotamia, together with a consideration of their relationships to Hebrew. 3 units. *Wintermute*

224B. Comparative Semitic II. An introduction to the morphology and syntax of classical Arabic and the Semitic languages of Palestine-Syria, together with a consideration of their relationships to Hebrew. 3 units. *Wintermute*

225. Living Issues in New Testament Theology. Critical examination of major problems and issues in New Testament interpretation and theology. 3 units. *Staff*

226. A-F. Exegesis of the Greek New Testament I.

- A. Matthew
- B. Romans
- C. Mark

E. The Gospel and Epistles of John
F. I and II Corinthians
3 units. *D. M. Smith or staff*

227, A-E. Exegesis of the Greek New Testament II.

A. Luke
B. Galatians
C. The Pastoral Epistles
D. Epistles of Peter and James
E. Acts 3 units.
D. M. Smith or staff

227F. Exegesis of the Greek New Testament II: The Synoptic Gospels. Concentration on the "classical" methods of studying the synoptic gospels: source criticism, form criticism, and redaction criticism. Students expected to become proficient in using the Greek synopsis. Prerequisite: two years of Greek or the equivalent. 3 units. *Sanders*

228. Twentieth-Century Continental Theology. An investigation of leading theologians and theological trends. 3 units. *Osborn*

231S. Seminar in Religion and Contemporary Thought. Analytical reading and discussion of such critical cultural analysis as is found in the works of Polanyi, Arendt, Trilling, and others, with appraisal of the relevance of theological inquiry. 3 units. *Staff*

232S. Religion and Literary Studies. Theories concerning the relation of religion to literary forms, particularly narrative. 3 units. *Kort*

233. Modern Narratives and Religious Meanings. A study of kinds of religious meaning or significance in representative American, British, and continental fiction of the first half of the twentieth century. 3 units. *Kort*

234. Early Christian Asceticism. The development of asceticism and monasticism in the first six centuries of Christianity. C-L: Women's Studies. 3 units. *Clark*

235. Heresy: Theological and Social Dimensions of Early Christian Dissent. 3 units. *Clark*

236. Luther and the Reformation in Germany. The theology of Martin Luther in the context of competing visions of reform. C-L: Medieval and Renaissance Studies. 3 units. *Steinmetz*

237. History of the Ancient Near East. Emphasis upon the religions, literature, and art of Mesopotamia. 3 units. *Bailey*

239. Introduction to Middle Egyptian I. Grammar and readings in hieroglyphic texts relating to the Old Testament. 3 units. *Wintermute*

247. Readings in Latin Ecclesiastical Literature. Readings in Latin of pastoral, theological, and church-disciplinary literature from the late patristic and medieval period. Prerequisite: knowledge of Latin. 3 units. *Keefe*

248. Theology of Karl Barth. A historical and critical study of Barth's theology. 3 units. *Osborn*

250. Women in the Medieval Church. The history of the Medieval Church told from its women figures: the life and writings of saints, heretics, abbesses, queens, mystics, recluses, virgins, bishops' wives, and reformers. C-L: Medieval and Renaissance Studies. 3 units. *Keefe*

253. Feminist Theory and the Study of Christianity. Nineteenth- and twentieth-century feminist theories and their implications for Christian doctrine and biblical interpretation. C-L: Women's Studies. 3 units. *Clark and McClintock-Fulkerson*

255. Christians in Religious Dialogue. An examination, from within Christian theology, of the principles of dialogue; of various contemporary dialogues with Jews, Muslims, Hindus, and Buddhists; and of traditional and emergent theologies of religion. 3 units. *Wainwright*

257. New Testament Ethics. Scope and basic problems of New Testament ethics; consideration of two important New Testament books. Problems and issues such as the role of the law, symbolic language in ethical discourse, conscience, homosexuality, the state, and self deception. 3 units. *Hays*

258. Coptic. Introduction to the Sahidic dialect with selected readings from Christian and Gnostic texts. Prerequisite: one year of Greek or consent of instructor. 3 units. *Wintermute*

260. Life and Times of the Wesleys. A seminar on John and Charles Wesley and their colleagues in relation to English culture and religion in the eighteenth century. 3 units. *Heitzenrater*

263. Third World Theology. An examination of selected theological writings from Asia, Africa, and Latin America, comparing their perspectives and their unique contributions with contemporary Christian thought. 3 units. *Staff*

266. Ethics and Health Care. 3 units. *H. Smith*

267. American Religious Thought. Examination of selected classic studies of American religious thought. 3 units. *Richey and Wacker*

268. Revelation and Authority in the Church. A critical and constructive examination of contemporary concepts. 3 units. *H. Smith*

270. American Evangelicalism and Fundamentalism. A study of some of the major themes in the development of transdenominational evangelicalism and fundamentalism in America from the eighteenth century to the present. This will be a reading seminar involving analyses and discussions of literature (mostly secondary works) important for understanding American evangelicalism as a distinct movement. 3 units. *Wacker*

271. Christologies of the Early Church. Investigation of important soteriologies and debates centering upon the person of Christ from the second through the fifth centuries. 3 units. *Staff*

272, A-B. The Early Medieval Church.

A. Selected Readings in Early Medieval Religious Studies

B. Social History of the Church in Europe.

Prerequisite: knowledge of Latin. C-L: Medieval and Renaissance Studies. 3 units. *Keefe*

275S. Topics in Early Christian and Byzantine Art. Consent of instructor required. See C-L: Art 233S; also C-L: Classical Studies 230S and Medieval and Renaissance Studies. 3 units. *Wharton*

276. The Sacraments in the Patristic and Early Medieval Period. A study of the celebration and interpretation of baptism or eucharist in the church orders and texts of the early church writers. 3 units. *Keefe*

277. Judaism in the Greco-Roman World. History, religion, and literature of the Jews in Palestine from 200 B.C.E. to 66 C.E. Not open to students who have taken Religion 137. Prerequisite: one year of Greek. 3 units. *Sanders*

284. The Religion and History of Islam. Origins and development of the Islamic community and tradition, with particular attention to the religious element. 3 units. *Cornell, Lawrence, or Partin*

286. The Second Vatican Council (1962-1965). A theological introduction to the Second Vatican Council, offering the opportunity to reflect on some of the fundamental aspects of the nature and identity of the Roman Catholic Church. 3 units. *Berger*

293. Religious Issues in American History. A reading seminar devoted to selected topics, problems, and issues in American religion. 3 units. *Richey and Wacker*

293A. Christianity and American Thought. A study of major issues and of the thought of some major persons since the time of the Revolution, with attention to the underlying assumptions of Christian and other American thought. 3 units. *Richey and Wacker*

295. Religion in the American South. A study of the interrelationships of southern religion and southern culture. 3 units. *Wacker*

For Graduates

303. The Old Testament in the New: New Testament Writers as Interpreters of Scriptures. This doctoral seminar examines the ways in which New Testament authors read and interpreted Scripture. Working knowledge of Greek and Hebrew required. 3 units. *Hays*

304. Aramaic. A study of the Aramaic portions of the Old Testament and selected passages from the Elephantine and Qumran texts. 3 units. *E. Meyers or Wintermute*

305. The Septuagint. A study of the modern critical use of the Greek Old Testament. Prerequisites: knowledge of Greek and Hebrew. 3 units. *Peters*

309. Hermeneutics. Consideration of the nature of understanding and of several interpretive methods—such as phenomenological, existential, historical, literary, structural—along with their application to New Testament texts, primarily the parables of Jesus. 3 units. *Staff*

310. Readings in Judaica. Selected studies in Jewish material culture and problems in Jewish religious and intellectual history. 3 units. *Bland, E. Meyers, and staff*

311. Pharisaic Judaism in the First Century. A reading course in first-century Pharisaic Judaism. 3 units. *Sanders*

312. Pauline Theology. Studies in some aspects of Paulinism in the light of recent scholarship. 3 units. *Sanders*

315A. Problems in the Study of Paul. Justification and the law in light of the chronology of the letters. A series of advanced seminars that combine study of a theological issue with an analysis of a nontheological problem (literary, historical, social). Prerequisite: at least one Greek exegesis course in the Pauline letters. 3 units. *Sanders*

321. The Theology of Paul: Structure and Coherence. Review of recent critical discussion of Pauline theology, with particular emphasis on the problem of the structure and coherence of Paul's thought. Reading knowledge of German, as well as some previous work in Greek exegesis of the Pauline corpus is required. 3 units. *Hays*

322. Nineteenth-Century European Theology. Protestant theology from Kant to Herrmann. 3 units. *Herzog*

329. Readings in Theology and Language. Sample treatments of religious language in linguistic analysis, hermeneutical theory, literary criticism, liturgical practice, and fundamental theology. 3 units. *Wainwright*

330. Contemporary Christologies. A seminar dealing with contemporary Roman Catholic and Protestant Christology. Readings and discussion will focus on theological proposals from major contemporary figures. 3 units. *Wainwright*

332. System in Theology. An examination of the various factors that go into the shaping of a systematic theology, followed by a study of several recent and contemporary examples of the genre. 3 units. *Wainwright*

333. The Doctrine of the Trinity. Biblical bases, patristic developments, contemporary statements and connections. 3 units. *Wainwright*

337. Theology of St. Thomas Aquinas. Intensive reading of the *Summa Theologica* and biblical commentaries. C-L: Medieval and Renaissance Studies. 3 units. *Steinmetz*

338. Calvin and the Reformed Tradition. The theological development of John Calvin. A comprehensive examination of his mature position with constant reference to the theology of other reformers. C-L: Medieval and Renaissance Studies. 3 units. *Steinmetz*

339. The Radical Reformation. Protestant movements of dissent in the sixteenth century. Special attention will be devoted to Müntzer, Carlstadt, Hubmaier, Schwenckfeld, Denck, Marpeck, Socinus, and Menno Simons. C-L: Medieval and Renaissance Studies. 3 units. *Steinmetz*

340, 341. Seminar in the New Testament. Research and discussion on a selected problem in the biblical field. Spring only. 3 units each. *Staff*

345. Catholic Moral Theology: Its History and Contemporary Issues. The development of Catholic social and moral theory from a historical and analytical perspective. Study of the Catholic social encyclicals as well as the casuistical tradition. Reading of works by Rahner, Haering, Fuchs, Schuller, McCormick, and Curran. 3 units. *Hauerwas*

347. Hebrew Narrative Art. Analysis of the literary craft of selected biblical narratives, and critique of various approaches to studying the art of Hebrew narrative. Prerequisites: knowledge of Hebrew and consent of instructor. 3 units. *Crenshaw*

348. Seminar in Theological Ethics. Philosophical paradigms and the nature of the Christian life. 3 units. *Hauerwas*

349. History and Historiography of Religion in North America. An opportunity for advanced students in North American religious studies to deepen their understanding of some of the major questions in the field. Examination of how religious history is actually written—with special attention to the imaginative and moral motivations that enter into that process. 3 units. *Wacker*

350, 351. Old Testament Seminar. Research and discussion on selected problems in the Old Testament and related fields. Fall only. 3 units each. *Staff*

352. Seminar in Christian Theology. Research and discussion of a selected problem in the systematic field. 3 units. *Staff*

360. Special Problems in Religion and Culture. Intensive investigation of the relations of religion and modernity, using seminal contemporary texts. Topics announced each semester. Consent of instructor required. 3 units. *Staff*

362. Readings in Old Testament and Semitic Studies. Selected studies in the Hebrew Bible and the languages and literatures of the ancient Near East. 3 units. *Staff*

363. Readings in New Testament and Christian Origins. Selected studies on a theme in modern New Testament scholarship. 3 units. *Staff*

364. Readings in History of Christianity. Selected issues in the social, material, and intellectual history of Christianity. 3 units. *Staff*

365. Readings in Christian Theology and Ethics. An examination of selected topics of historical and contemporary interest in these fields. 3 units. *Staff*

366. Readings in History of Religions. Selected studies in cross-cultural and intercreedal material, together with assessment of the problems they pose for the study of religion. 3 units. *Staff*

367. Readings in Religion and Culture. Analysis and discussion of theories and of individual research projects. 3 units. *Staff*

383. Moral Theology in the Twentieth Century. Critical and comparative examination of ethical theory as exhibited in the work of selected contemporary theologians. 3 units. *H. Smith*

388. Ethics and Medicine. A critical study of selected aspects of modern biomedical technology, with special reference to the ethical assumptions informing their development and practice. 3 units. *H. Smith*

COURSES CURRENTLY UNSCHEDULED

200. Person and Work of Christ

210. Contemporary British Theology

240. Introduction to Middle Egyptian II

241. Problems in Reformation Theology

242. Life after Death in Semitic Thought

243. Archaeology of Palestine in Biblical Times

244. Archaeology of Palestine in Hellenistic-Roman Times

245. Ethics in World Religions

246. Problems in Historical Theology

249. The Lord's Prayer

251. Counter-Reformation and Development of Catholic Dogma

252. Nineteenth- and Twentieth-Century Roman Catholic Theology

256. John Wesley in Controversial and Ecumenical Theology

259. Icon Theology

261. Islam in the African-American Experience

262. Marxist Ideology and Christian Faith

264. The Sociology of the Black Church

269S. Feminist Theory and the Humanities

273. Continental and British Roots of Evangelicalism

274A. Philosophies, Sciences, and Theologies of the European Enlightenment: Descartes to Kant

274B. Philosophies, Sciences, and Theologies after the European Enlightenment: Schleiermacher to Troeltsch

279. Understandings of the Resurrection in Contemporary Thought

280. The History of the History of Religions

283. Islam and Modernism

288. Buddhist Thought and Practice

289. Theology and Contemporary Secular Understanding of Human Nature

290. Current Problems in Christian Social Ethics

291. Historical Forms of Protestant Ethics

292. Happiness, Virtue, and Friendship

294. Christianity and American Society

296. Community, Faith, and Violence

297. Philosophical and Theological Discourses on Modernity

298. Religious Pluralism and Christian Theologies

299. The Christian Understanding of Human Nature and Destiny

300. Systematic Theology

301. Seminar in Contemporary Christian Ethics

304A. Targumic Aramaic

308. Greek Patristic Texts

313. The Apostolic Fathers

314. Judaism and Christianity in the New Testament

316S. History of Religions

317. Seminar in the Greek Apologists

318. Seminar in the Greek Fathers

319. The Gospel According to Saint Matthew in Recent Research

320. Theology, Power, and Justice

324. Readings in the History of Religion

325. Philosophical Theology I

326. Philosophical Theology II

327. Philosophical Method in Religious Studies

328. Twentieth-Century European Theology

331. Eschatology

334. Theology and Reform in the Later Middle Ages

335. The English Church in the Eighteenth Century

- 336. **Worlds and Texts**
- 342. **American Religious Biography**
- 343. **Readings in Ancient Near Eastern Wisdom Literature**
- 344. **Zwingli and the Origins of Reformed Theology**
- 346. **Practical Reason and Personal Identity: Explorations in Narrative**
- 353. **Seminar on Text Criticism**
- 373-374. **Elementary Akkadian**
- 380. **Existentialist Thought**
- 386. **Christianity in Dialogue with Other Faiths**
- 387. **Ethical Method**
- 389. **Christian Ethics and Contemporary Culture**
- 397. **Readings in North American Religious History**
- 398. **Colloquium on the Teaching of Religion**
- 401. **Colloquium on Biblical Studies**

Romance Studies

Professor Mignolo, *Chair* (205 Languages); Professor Schor, *Director of Graduate Studies* (205 Languages); Professors Caserta, Garci-Gómez, Jameson, Moi, Mudimbe, Orr, Osuna, Pérez Firmat, Tetel, and Thomas; Associate Professors Bell, Hull, Kaplan, Mudimbe-Boyi, and Sieburth; Assistant Professors Farrell, Finucci, Moreiras, Ross, Solterer, and Vilarós; Adjunct Associate Professor Keineg; Associate Professor of the Practice and Director of Language Programs Tufts; Research Professor Dorfman

The Department of Romance Studies offers graduate work leading to the Ph.D. degree in French and Spanish. Related work is required in a second Romance language or in any one or two of a number of other subject areas. A reading knowledge of one foreign language which is outside the major language is required. In order to undertake graduate study in Romance languages, the entering student should have credit for at least 18 semester hours (or equivalent) above the intermediate level in the major language.

FRENCH

For Seniors and Graduates

- 200S. **Seminar in French Literature.** Topics to be announced. 3 units. *Staff*
- 210. **The Structure of French.** Modern French phonology, morphology, and syntax. Readings in current linguistic theory. 3 units. *Thomas*
- 211. **History of the French Language.** The evolution of French from Latin to its present form; internal developments and external influences. C-L: Medieval and Renaissance Studies. 3 units. *Thomas*
- 223. **Semiotics for Literature.** Theoretical writings in general semiotics by Frege, Peirce, Saussure, Mukarovsky, and Morris and their applications for textual analysis of French literary works by representative contemporary critics such as Eco, Riffaterre, Corti, and Greimas. Taught in English. C-L: Literature 280. 3 units. *Thomas*

256. Modern Literature and History. The problems of history, society, and politics in literature, through the writings of Rousseau, Tocqueville, Michelet, Flaubert, Hugo, Merleau-Ponty, Foucault, and others. C-L: History 256. 3 units. *Orr*

258. The Narrative of Social Crisis. Realism and naturalism, with special emphasis on Balzac, Flaubert, and Zola. 3 units. *Bell, Jameson, Orr, or Schor*

261. French Symbolism. Poetry and theories of Baudelaire, Mallarmé, and Rimbaud. Decadence: Lautréamont and Laforgue. 3 units. *Thomas*

264. Contemporary French Poetry. The language of poetry. A chronological and theoretical approach to the major poets and movements since 1950. Selections from Bonnefoy, Char, Daive, Deguy, Dupin, Jabès, Jaccottet, Faye, Guillevic, Michaux, Meschonnic, Noël, Oulipo, Ponge, Stefan, Tortel, and others. 3 units. *Orr or Thomas*

265. French Literature of the Early Twentieth Century. Emphasis on Gide, Mauriac, Proust, and Colette. 3 units. *Kaplan*

266. French Literature of the Mid-Twentieth Century. Emphasis on Malraux, Sartre, Camus, and the *nouveau roman*. 3 units. *Jameson*

281. Paradigms of Modern Thought. An introduction to contemporary French philosophy with a focus on the notions of identity and difference, the human origin of truth and the question of enunciation. French majors and French graduate students must do course work in French. 3 units. *Mudimbe*

For Graduates

300. Graduate Reading Course. An intensive course in French to develop rapidly the ability to read French in several fields. Graduate students only. No credit. *Staff*

325. Topics in Renaissance Prose. Rabelais, Marguerite de Navarre, Montaigne, and others. C-L: Medieval and Renaissance Studies. 3 units. *Tetel*

326. Topics in Renaissance Poetry. C-L: Medieval and Renaissance Studies. 3 units. *Tetel*

348. French Literature of the Seventeenth Century. The baroque and the classical: form and meaning in the plays of Corneille, Racine, and Molière. Readings in baroque and précieux poetry. C-L: Medieval and Renaissance Studies. 3 units. *Farrell*

351, 352. Literature of the Eighteenth Century. Problems of literary history, critical reading, and interpretation, focused on varying topics. 3 units each. *Stewart*

355. French Preromantic and Romantic Poetry. Chénier, Vigny, Lamartine, Musset, Hugu, and Nerval. 3 units. *Orr*

367. Contemporary French Novel. A chronological and theoretical approach to the major writers and movements since 1970. Selections from Duras, LeClézio, Sallenave, Modiano, Sollers, Tournier, Oulipo, Yourcenar, and others. 3 units. *Kaplan, Orr, or Thomas*

368. Structuralism. An introduction to contemporary French philosophy with a focus on the notions of identity and difference, the human origin of truth and the question of enunciation. The work of Claude Lévi-Strauss or Michel Foucault will be considered as a paradigm. Additional readings might include chapters from Georges Canguilhem, Vincent Descombes, Jean Hyppolite, Alexandre Kojève, Maurice Merleau-Ponty, and Elliott Valenstein. 3 units. *Mudimbe*

370. Topics in French and Francophone Literature. Concentration on twentieth-century literature. Historical and theoretical approach. Varying topics. Readings include literary and nonliterary texts. 3 units. *Keineg or Mudimbe-Boyi*

381. Special Topics Tutorial. Directed reading and research in areas unrepresented by regular course offerings. 3 units. *Staff*

391, 392. French Seminar. C-L: Medieval and Renaissance Studies. 3 units each. *Graduate faculty*

Courses Currently Unscheduled

240. Old French Literature

257. Problems of Identity in the Nineteenth-Century Novel

263. Contemporary French Theater

290S. Studies in a Contemporary Figure

ITALIAN

For Seniors and Graduates

283. Italian Novel of the Novecento. Representative novelists from Svevo to the most recent writers. 3 units. *Caserta*

284, 285. Dante. 284: *La Vita Nuova* and a close reading of the *Inferno*. 285: The *Purgatorio* and the *Paradiso* in the light of Dante's cultural world. Special attention will be given to the poetic significance of the *Commedia*. Reading in Italian or English. Prerequisite: for 285, Italian 284 or equivalent. C-L: Medieval and Renaissance Studies. 3 units each. *Caserta*

381. Special Topics Tutorial. Directed reading and research in areas unrepresented by regular course offerings. 3 units. *Staff*

PORTUGUESE

For Graduates

200S. Seminar in Portuguese Literature. Topics to be announced. 3 units. *Staff*

202. Topics in Portuguese and Brazilian Literature and Culture. 3 units. *Staff*

SPANISH

For Seniors and Graduates

200S. Seminar in Spanish Literature. Topics to be announced. 3 units. *Staff*

210. History of the Spanish Language. Formation and development. Internal forces and external contributions. C-L: Medieval and Renaissance Studies. 3 units. *Garci-Gómez*

244. Topics in Twentieth-Century Latin American Fiction. Study of various critical problems in the narrative of the area. Focus on one or more major issues, such as the representation of violence, magical realism, *indigenismo*, *novela de la tierra*. Prerequisite: Spanish 106. *Moreiras*

245. Latin-American Poetry. Focus on major movements and authors. Non-mainstream poetical traditions, such as poetry written in Quechua, oral poetry. Prerequisite: Spanish 106. 3 units. *Moreiras or staff*

248. Studies in Spanish-American Literature. Concentration on single authors, genres, movements, or themes. 3 units. *Staff*

250. Latin American Film. Study of Latin American film through selected films and critical texts. Attention paid to contemporary production given availability, such as the work of Raúl Ruiz, Miguel Littin, Eliseo Subiela. *Moreiras and staff*

275. Modern Spanish Poetry. Juan Ramón Jiménez, Unamuno, Antonio Machado, the Generation of 1927, and the contemporary poets. 3 units. *Osuna*

For Graduates

341. Colonial Prose of Spanish America. Narrative forms written in Spanish America during the sixteenth, seventeenth, and eighteenth centuries. C-L: Medieval and Renaissance Studies. 3 units. *Ross*

342. Colonial Poetry and Theater of Spanish America. The expression of Renaissance and Baroque styles in the Hispanic New World, including works of Sor Juana, Ruiz de Alarcón, Ercilla, and others. C-L: Medieval and Renaissance Studies. 3 units. *Ross*

344. Philosophy, Cultural History, and Literature in Latin America. Special topics. 3 units. *Mignolo*

346. Modern Spanish-American Fiction. Twentieth-century novels and short stories by Borges, Carpentier, Cortázar, Gallegos, García Márquez, Quiroga, and others. 3 units. *Pérez Firmat*

351. The Origins of Spanish Prose Fiction. Selected examples of the romance and the novel: *Amadís de Gaula*, Diego de San Pedro's *La Cárcel de amor*, the *Abencerraje*, the *Lazarillo*, Montemajor's *Diana*. C-L: Medieval and Renaissance Studies. 3 units. *Staff*

353. Cervantes. The life and works of Cervantes, with special emphasis on his Quijote. C-L: Medieval and Renaissance Studies. 3 units. *Staff*

354. Drama of the Golden Age. The chief Spanish dramatists of the seventeenth century with readings of representative plays of this period. C-L: Medieval and Renaissance Studies. 3 units. *Staff*

355. Romantic Literature and French Culture and Politics. French literature in the context of postrevolutionary society and culture. Readings may include nineteenth-century poetry (Hugo, Desbordes-Valmore), theater (Musset), political or philosophical prose, and historical discourse as well as contemporary critical and historical analyses of the period. 3 units. *Staff*

358. Spanish Lyric Poetry before 1700. A critical study, based on close reading and discussion, of selected poems of the Middle Ages, Renaissance, and baroque. Special emphasis on the *Razón de amor*, *la Poesía de tipo tradicional*, and *Santillana*; on Garcilaso, San Juan de la Cruz, Fray Luis de León, and Herrera; on Góngora and Quevedo. C-L: Medieval and Renaissance Studies. 3 units. *Staff*

360. Cross-cultural (Mis)Understanding: Europe and the New World, 1480-1800. Survey form or in-depth analysis of specific topics: the interrelations between Europe and the New World from the Renaissance to the Enlightenment, and from the last decades of the Inca and Aztec Empires to the wars of independence. The "clash of civilizations" and its implications for the cultural history of the early modern period and for the colonial expansion of the west. 3 units. *Mignolo*

365. Thinking Independence: From Tupac Amaru to 1898. Study of the cultural problems surrounding the Latin American wars of independence, and the pre- and post-independence periods. May focus on foundational fictions, political writings, the so-called Romantic period. 3 units. *Moreiras*

366. Nineteenth-Century Prose Fiction. Readings by novelists such as Valera, Galdós, Alas, and Pardo Bazán in the light of current critical theory. 3 units. *Sieburth*

370. Spanish Texts of the Post-Dictatorship: 1975 to Present. An analysis of some artistic and popular productions that came to light in Spain after Franco's death in 1975. Focus on literary and cinematic texts and other cultural productions such as music and comics. 3 units. *Vilarós*

371. Cultural History and Theory. Seminar covering various topics in Latin American cultural history and theoretical production such as: (a) colonial legacies and postcolonial theories; (b) the construction of identities and the critique of cultural colonialism; (c) contemporary critical production in Latin America, from dependency theory to transnationalism and postmodernity. May be repeated for credit. 3 units. *Mignolo or Moreiras*

375. Hispanic Literature, Mass Culture, and Theory. A study of Hispanic texts thematizing the effects of mass cultural fictions (serial novels, radio songs, movies) on those who consume them. Fictional works will be juxtaposed with theories on the effects of mass culture and its relationship to canonical literature. Authors of fictional texts include Cervantes, Galdós, Martí, Borges, Marsé, Puig, and Martín Gaité. 3 units. *Sieburth*

381. Special Topics Tutorial. Directed reading and research in areas unrepresented by regular course offerings. 3 units. *Staff*

391, 392. Hispanic Seminar. Each semester one of the following topics will be selected for intensive treatment: the Spanish language in America, studies in medieval literature, studies in the literature of the Golden Age, studies in Latin American literature, studies in the Spanish Renaissance and baroque, studies in Spanish poetry, studies in nineteenth-century Spanish literature, and studies in twentieth-century literature. C-L: Medieval and Renaissance Studies. 3 units each. *Staff*

Courses Currently Unscheduled

262. The Romantic Movement

276. Modern Spanish Drama

277. Modern Spanish Novel

ROMANCE STUDIES

306. Theories and Techniques of Teaching Foreign Languages. A survey of approaches to foreign language teaching, an introduction to the theoretical notions underlying current trends, and a language-specific practicum. 3 units. *Tufts*

310. Critical Frameworks. An introduction to critical theory through a series of interconnected readings organized around a major theoretical approach or issue. 3 units. *Staff*

Courses Currently Unscheduled

218. The Teaching of Romance Languages

Slavic Languages and Literatures

Associate Professor Lahusen, *Chair*; Assistant Professor Gheith, *Director of Graduate Studies*; Associate Professors Andrews, Dobrenko, and Pugh; Associate Professor Emeritus Jezierski; Adjunct Associate Professor Pelech; Assistant Professors of the Practice Dolgova, Flath, Maksimova, and Van Tuyl

The Department of Slavic Languages and Literatures offers graduate work leading to the A.M. and Ph.D. degrees in Russian literature and Slavic linguistics. Entering

students should have had sufficient undergraduate courses in the Russian language to enable them to proceed to more advanced work. Requirements for the A.M. degree may be met by completion of course work and by passing a comprehensive exam. Reading knowledge of French or German is required for both concentrations. All students must demonstrate advanced knowledge of the Russian language. The A.M. program is expected to take one to two years for completion. Candidates for the Ph.D. degree must have received an A.M. degree at Duke or be able to demonstrate that their previous studies qualify as an equivalent to the A.M. degree offered by Duke. Individual programs of study are developed for each student but all students in Russian literature must demonstrate extensive knowledge of Russian literature, competence in another Slavic literature (or, in special circumstances, in a non-Slavic literature), and in literary theory. Literature students must exhibit competence in at least one other Slavic language from the West or South Slavic area. Students in Slavic linguistics must demonstrate competence in Russian and Slavic diachronic and synchronic linguistics, and in general linguistic theory. Linguistics students must demonstrate knowledge of one Slavic language from the West and one from the South Slavic area, in addition to Russian. Knowledge of these areas will be determined through the preliminary examination. Following successful completion of the preliminary examination, students will be expected to write and defend a dissertation based on original research. All Ph.D. candidates are required to teach at least one full academic year as teaching experience is essential in completing one's professional training.

Further information about the graduate programs, including specific requirements, can be obtained from the Director of Graduate Studies.

RUSSIAN

For Seniors and Graduates

201S. Topics in Comparative Slavic Linguistics. A cycle of survey courses on the phonology, morphology, and dialects of the Slavic languages. Taught in English. Readings in Russian.

- A. East Slavic
- B. West Slavic
- C. South Slavic
- D. Common Slavic

3 units. *Andrews or Pugh*

203S. Old Church Slavonic. Introduction to the language of the earliest Slavic texts. Close study of phonological and morphological systems, reading of texts and discussion. Taught in English. C-L: Religion 229S. 3 units. *Pugh*

204S. Russian Folklore and Popular Culture. Work songs and ritual songs, lamentations, riddles, and proverbs. Tales and later forms of popular creation (*chastushki*, anecdotes, urban romance) and their function in Russian culture. Taught in Russian. 3 units. *Dolgora*

205. Semiotics and Linguistics. A survey of modern semiotics, particularly the works of C. S. Peirce and Umberto Eco. Semiotic works directly related to modern linguistic thought and linguistic sign theory. Emphasis on the interdisciplinary aspects of semiotic theory. C-L: English 205. 3 units. *Andrews (Slavic)*

207S. Semantics. Survey of modern semantic theory, including a range of theoretical approaches: communication theory, structuralism, markedness, and generative semantics. Emphasis on lexical meaning and deictic relations. Taught in English. 3 units. *Andrews*

208. Stylistic and Compositional Elements of Scholarly Russian. Introduction to Russian texts and terminology including business, economics, law, history, political

sciences, psychology, linguistics, and literary criticism. Prerequisite: Russian 64 or consent of instructor. 3 units. *Maksimova*

210. Literature and Criticism of Socialist Realism. The genesis and development of Soviet socialist realism. A survey of Soviet literary theories from Lunacharsky to Ovcharenko, and contemporary Western criticism (for example, K. Clark, R. Robin). A critical approach to the dialogic alternative to monologic literature through literary illustration (selected Soviet literary works from the 1930s to the present day). Taught in English. 3 units. *Lahusen*

230. Soviet Cinema. History of Soviet film industry from silent to sound period. Overview of major theorist-filmmakers: Eisenstein, Pudovkin, Vertov. Issues of reception, audience, politics, form, national and ethnic identities. Taught in English. 3 units. *Gaines, Jameson, and Lahusen*

240S. Russian Literary Discourse. Nineteenth- and twentieth-century Russian literary theory, with close readings in the original. Application to fiction. Taught in English. 3 units. *Lahusen*

250. Trends in Russian and East European Literary Criticism and Beyond. The major critical movements in the nineteenth and twentieth centuries in Russia, East-Central Europe, and the West. Authors and theories include the Belinsky school, formalism, Bakhtin, structuralism, semiotics, and psychoanalytic and feminist theory. Taught in English. 3 units. *Gheith*

261, 262. Nineteenth-Century Russian Literature. Selected nineteenth-century authors, works, and genres. Authors include Pushkin, Lermontov, Gogol, Turgenev, Dostoevsky, Tolstoy, and Chekhov. Taught in English. Readings in Russian. 3 units each. *Staff*

265S. Literature of Early Russia. Works from the eleventh to the seventeenth centuries, including Ilarion's *Sermon on Law and Grace*, *The Tale of Bygone Years*, *The Igor Tale*, *Domostroi*, *Avvakum's Life*. Readings in Russian. 3 units. *Dolgova and staff*

266S. The Sources of Modern Russian Literature: The Eighteenth Century. Development of the major forms of Russian literature, including verse, drama, and the beginnings of the prose tradition. Authors include Kantemir, Lomonosov, Sumarokov, Trediakovsky, Fonvizin, Derzhavin, and Karamzin. Readings in Russian. 3 units. *Gheith*

269. Women and Russian Literature. Women authors in Russia from the eighteenth century to the present: their works and lives. The role that works by women have played in Russian literature and culture. The question of whether women's writing in Russia constitutes a tradition. Authors include Dashkova, Catherine the Great, Kovalevskaja, Kollontai, Chukovskaja, Akhmatova, Petrushevskaja, and Tolstaia. Taught in English. Readings in Russian. C-L: Women's Studies. 3 units. *Gheith*

272S. Pushkin and His Time. Pushkin and the literary revolution around 1830. Prose works (*The Tales of Belkin*, *The Queen of Spades*, *The Captain's Daughter*) and major lyrical poetry. Taught in English. Readings in Russian. 3 units. *Gheith or Van Tuyl*

273S. Gogol. Life, works, and criticism. Readings include *Dead Souls*, *The Inspector General*, *Petersburg Tales*, and other short fiction. Readings in Russian. 3 units. *Lahusen*

275. Tolstoy. Introduction to life, works, and criticism. Readings include: *War and Peace*, *Anna Karenina*, the shorter fiction, dramatic works and essays. Taught in English. Readings in Russian. 3 units. *Van Tuyl*

276. Dostoevsky. Introduction to life, works, and criticism. Readings include: *Crime and Punishment*, *The Idiot*, and *The Brothers Karamazov*. Taught in English. Readings in Russian. 3 units. *Flath, Gheith, or Van Tuyl*

277S. Chekhov. Drama and prose works. Readings in Russian. 3 units. *Flath*

278. Russian Short Fiction. The history, development, and discontinuities of Russian short fiction in the nineteenth and twentieth centuries. Authors include Dostoevsky, Vovchok, Leskov, Chekhov, Gippius, and Zoshchenko. Topics include gender, genre, and national identity in historical/cultural context. Taught in English. 3 units. *Gheith*

279S. Literature of the Former Soviet Republics. Ukrainian realism of the nineteenth century, futurism, neoclassicism, and the literary struggle of the 1920s; Belorussian literature; Lithuanian psychological prose; the Estonian experimental novel; Georgian literature from Rustaveli to the philosophical novel of the 1970s; the work of Chingiz Aitmatov; Soviet "recent literacy." Taught in Russian. 3 units. *Dobrenko*

280. Early Twentieth-Century Russian Literature: From Symbolism to the 1920s. Symbolism, acmeism, futurism, imagism, proletarian literature. Authors include Bely, Sologub, Bryusov, Blok, Vyacheslav Ivanov, Khodasevich, Akhmatova, Mandelshtam, Mayakovsky, Khlebnikov, Gorky, Bogdanov, Gastev. Readings in Russian. 3 units. *Lahusen*

281. The 1920s: The Road to a New Synthesis. The literary struggle of the 1920s; proletarian literature from the Smithy to RAPP, LEF and the fate of the avant-garde, the aesthetic conception of Preval, the literature of the absurd, Oberiu and the Serapion Brothers. Authors include Kirillov, Gladkov, Babel, Pilnyak, Olesha, Zamyatin, Platonov, Kharms, and Pasternak. Readings in Russian. 3 units. *Dobrenko or Lahusen*

282. Socialist Realism: Soviet Literature of the 1930s and 1940s. The Stalin era of Russian literature, the genesis and development of socialist realism, Soviet literature and the theme of boundaries and war. Authors include Sholokhov, Ostrovsky, Fadeev, Azhaev, Babaevsky, Kochetov, and Simonov. Readings in Russian. 3 units. *Dobrenko or Lahusen*

283. Post-Stalinist and Contemporary Soviet Literature. Literature of the thaw after Stalin: the young prose, little realism, new modernism, and rural prose. Authors include Aksyonov, Trifonov, Baranskaya, Bitov, Solzhenitsyn, Rasputin, Shukshin, and Zalygin. Readings in Russian. 3 units. *Dobrenko or Lahusen*

284. Literature under and after Glasnost. From the "recovered" avant-garde to the new literature during the Gorbachev era and beyond. The unmasking of Soviet history and its aestheticization. Underground literature and Soviet postmodernism. Authors include Rybakov, Pietsukh, Petrushevskaya, Kuraev, Tolstaya, Viktor Erofeev, Makanin, Prigov, and Narbikova. Readings in Russian. 3 units. *Dobrenko, Gheith, or Lahusen*

285. Babel and the Russian-Jewish Cultural Dialogue of the Twentieth Century. The Jews and the Russian revolution. The Odessa school in the literature of the 1920s. Works include *Red Cavalry*, *Odessa Stories*, and *The Sunset*. Readings in English or Russian. 3 units. *Dobrenko*

286S. Zamyatin. The novel *We*, short fiction, and essays. Taught in English. Readings in English or Russian. Not open to students who have taken the former Russian 177S/277S (Zamyatin). 3 units. *Andrews, Maksimova, or Lahusen*

287S. Platonov. The novels *Chevengur*, *The Foundation Pit*, and shorter fiction. Taught in English. Readings in English or Russian. 3 units. *Lahusen*

288S. Bulgakov. Works include *Master and Margarita*, *The White Guard*, *A Theatrical Novel*, and *The Heart of a Dog*. Readings in English or Russian. 3 units. *Andrews, Maksimova, and staff*

290. Trifonov, or the Life and Death of the Soviet Intelligentsia. The Russian and Soviet intelligentsia, its role and historical responsibility, depicted by one of the most visible representatives of the "generation of the sixties." Works include *The Exchange*, *Taking Stock*, *The Long Goodbye*, *Another Life*, *The House on the Embankment*, *The Old Man*. Readings in Russian. 3 units. *Dobrenko*

297. Russian Poetry. Focus on nineteenth and twentieth centuries, including the Golden Age and the Silver Age. Authors include Pushkin, Lermontov, Bely, Blok, Akhmatova, Tsvetaeva, Mandelstam, Pasternak, and Mayakovsky. Taught in English or Russian, according to students' Russian language proficiency. Russian texts. 3 units. *Van Tuyl*

298. Akhmatova. The works and times of Anna Akhmatova, the most prominent woman poet in Russian history. Focus on Akhmatova's works and the Russian political and artistic milieu of the 1910s and 1920s, socio-literary issues of later periods. Readings include the lyric poems of 1910-60, *Requiem*, and *Poem Without a Hero*. Readings in Russian. 3 units. *Van Tuyl*

For Graduates

301, 302. Elementary Russian. Introduction to understanding, speaking, reading, and writing. Audiolingual techniques are combined with required recording-listening practice in the language laboratory. 3 units each. *Staff*

303, 304. Intermediate Russian. Intensive classroom and laboratory practice in spoken and written patterns. Reading in contemporary literature. Prerequisite: Russian 301, 302 or consent of instructor. 3 units each. *Staff*

305, 306. Advanced Russian Conversation and Readings. Nineteenth- and twentieth-century literature in the original. Conducted in Russian. Prerequisite: Russian 303, 304 or consent of instructor. 3 units each. *Staff*

307. Advanced Russian. Advanced grammar review with an emphasis on the refinement of oral and written language skills. Development of writing style through compositions and essays. Prerequisite: Russian 306 or consent of instructor. 3 units. *Andrews*

308. Advanced Russian: Readings, Translation, and Syntax. Intensive reading and conversation with emphasis on contemporary Russian literary and Soviet press texts. English-Russian translation stressed. Russian media, including television and films. Prerequisite: Russian 307 or consent of instructor. 3 units. *Andrews*

309, 310. Russian Stylistics and Conversation. Refinement of stylistic control and range in spoken and written Russian. Emphasis on fluent discursive skills, as well as development of expository prose style. Prerequisites: Russian 307 and 308, or consent of instructor. 3 units each. *Maksimova*

311S, 312S. Advanced Russian Language and Culture. Advanced grammar review with additional emphasis on phonetics and conversation. Culture component includes literature, films, museums, and theater performances. (Taught in St. Petersburg in Russian.) Prerequisite: Russian 306 or equivalent. 3 units each. *Staff*

335. Contemporary Russian Media. Analytical readings and study of change and development in all the primary forms of former Soviet mass media from 1985 to the present (newspapers, journals, and television). Topics include censorship, TASS, samizdat. Taught in English. Readings in Russian. Prerequisite: Russian 64 or equivalent. 3 units. *Andrews*

350. Methods in Teaching Russian. The theory and practice of teaching Russian language to English-speaking students. 1 unit. *Andrews*

351. Topics in Teaching Methodology. Application of linguistic principles in the classroom. No prior knowledge of linguistics required. 2 units. *Staff*

399. Special Readings. Advanced readings in nineteenth- and twentieth-century Russian literature in the original. 3 units. *Staff*

BALTO-FINNIC

For Seniors and Graduates

200. Balto-Finnic Linguistics. Introduction to Balto-Finnic languages with emphasis on the established literary languages, Finnish and Estonian. Analysis of their phonological and morphological structures. Survey of related nonliterary languages such as Karelian and Vepsian. Taught in English. 3 units. *Pugh*

POLISH

For Seniors and Graduates

274S. Topics in Polish Literature. Selected Polish writers and works in their literary and historical contexts. Includes responses of major European and American writers. Taught in English. 3 units. *Staff*

287. Introduction to Polish Literature. Survey of nineteenth- and twentieth-century Polish literature. Taught in English. 3 units. *Staff*

Sociology

Professor Land, *Chair* (268 Sociology-Psychology); Professor DiPrete, *Director of Graduate Studies* (341 Sociology-Psychology); Professors Cook (public policy and economics), George, Lewin (business), Lin, Maddox, Myers, O'Barr (cultural anthropology), Simpson, Smith, Tiryakian, and Wilson; Associate Professors Gereffi, Haveman (business), O'Rand, Spenner, and Weinberger (medicine and Aging Center); Assistant Professors Boychuk (health policy research and education), Gao, Gold (psychiatry and Aging Center), Jackson, Janoski, Parnell, and Thornton; Professors Emeriti Back Kerckhoff, and Preiss; Research Professor Manton (demographic studies); Visiting Professor Gittler

The department offers graduate work leading to the A.M. and Ph.D. degrees in sociology. Entering graduate students should already have completed a minimum of 12 semester hours in sociology and an additional 12 semester hours in related work (e.g., other social sciences, statistics, computer science, philosophy, mathematics). Accepted applicants who have not had such preparation may be required to take work beyond the usual requirements. Applicants for admission are required to take the verbal and quantitative aptitude tests of the Graduate Record Examination.

The Ph.D. program requires the student to take five core courses and a primary and additional courses in a secondary specialization. The core courses include: Sociological Theory (206), Social Statistics I and II (207, 212), and two out of three methods courses (208, 214, 215). Specializations (with the associated proseminars indicated in parentheses) include Life Course and Aging Studies (Sociology 221S); Comparative and Historical Sociology (Sociology 222S); Crime, Law, and Deviance (Sociology 223S); Population Studies (Sociology 224S); Organizations, Markets, and Work (Sociology 225S); Medical Sociology (Sociology 227S); and Stratification, Mobility, and Labor Force Behavior (Sociology 228S). A student entering with only an undergraduate degree and adequate course preparation would need to take fourteen courses to satisfy degree requirements.

Up to fifteen credits, the equivalent of five courses, may be transferred for graduate work taken elsewhere.

Further details concerning the general departmental program, the specialities and their requirements, departmental facilities, the faculty, ongoing research, and stipends available may be obtained from the director of graduate studies.

For Seniors and Graduates

206. Sociological Theory. Structure, foundations, and historical antecedents of recent formulations of such theoretical approaches as phenomenological sociology, exchange theory, critical theory, structuralism, neo-Marxist sociology, sociobiology, and action theory. 3 units. *Tiryakian or Wilson*

207. Social Statistics I: Basic Concepts and Methods. Review of descriptive statistics; probability concepts; statistical inference, t-tests, and the analysis of variance. Bivariate correlation and regression, dummy variables, multiple regression, and the analysis of covariance. Stress on applications. Statistical computing using SPSS and other programs. 3 units. *DiPrete or Land*

208. Survey Research Methods. Theory and application of survey research techniques in the social sciences. Sampling, measurement, questionnaire construction and distribution, pretesting and posttesting, response effects, validity and reliability, scaling of data, data reduction and analysis. Prerequisite: Sociology 207 or the equivalent. 3 units. *Lin or Smith*

211S, A-E. Proseminars in Sociological Theory. Development of sociological thought; systematic sociological theory; interrelations with other social and behavioral sciences.

- A. Background of Sociology
 - B. Formal Aspects of Theory
 - C. Sociology of Knowledge
 - D. Evolutionary Theory and Sociobiology
 - E. Special Topics in Sociological Theory
- 3 units. *Tiryakian or Wilson*

212. Social Statistics II: Linear Models, Path Analysis, and Structural Equation Systems. Model specification, review of simple regression, the Gauss-Markov theorem, multiple regression in matrix form, ordinary and generalized least squares, residual and influence analysis. Path analysis, recursive and nonrecursive structural equation models; measurement errors and unobserved variables. Application of statistical computing packages. Prerequisite: Sociology 207 or equivalent. 3 units. *DiPrete or Land*

213. Social Statistics III: Discrete Multivariate Models. Assumptions, estimation, testing, and parameter interpretation for the log-linear, logit, logistic, and probit models. Model comparisons; applications of statistical computing packages and programs. Prerequisite: Sociology 212 or equivalent. 3 units. *DiPrete or Land*

214. Comparative and Historical Methods. Introduction to the theory of comparative research and analysis in the social sciences with special emphasis on comparative methods, quasi-experimental designs, and case studies. C-L: Political Science 217. 3 units. *Gereffi, Janoski, Lin, Smith, or Tiryakian*

215. Basic Demographic Methods and Materials. Population composition, change, and distribution. Methods of standardizing and decomposing rates, life tables and population models, analysis of data from advanced and developing countries. Applications of computer programs for demographic analysis. Prerequisite: Sociology 207 or equivalent. 3 units. *Myers or Parnell*

217S, A-F. Proseminars in Social Statistics and Research Methods. Selected topics in the collection and analysis of social science data.

- A. Discrete and Continuous Models of Measurement
- B. Hazards Models, Event History Analysis, and Panel Data
- C. Dynamic Models and Time Series Analysis
- D. Research Design
- E. Evaluation Research Methods
- F. Special Topics in Social Statistics and Research Methods

3 units. *DiPrete or Land*

221S, A-D. Proseminars in Aging and Life Course Analysis. Selected topics in socialization, human development, status attainment and careers, and the sociology of aging.

- A. Social Structure and the Life Course
- B. Social Patterns of Personal Development
- C. Social Gerontology
- D. Special Topics in Aging and Life Course Analysis

3 units. *Jackson, Maddox, Myers, O'Rand, or Spenner*

222S, A-G. Proseminars in Comparative and Historical Sociology. Selected topics in the differentiation and transformation of societies.

- A. Theories of Social Change
- B. Globalization and Comparative Development
- C. Societal Transformations and Social Institutions
- D. Culture, Values, and Ideas
- E. Social Movements and Political Sociology
- F. Comparative Social Policies
- G. Special Topics in Comparative and Historical Sociology

3 units. *Gao, Gereffi, Janoski, Lin, Simpson, Smith, or Tiryakian*

223S, A-E. Proseminars in Crime, Law, and Deviance. Selected topics in crime and the institutions of social control.

- A. Theories of Crime Causation
- B. Human Development and Criminal Careers
- C. Social Control and the Criminal Justice System
- D. Sociology of Law
- E. Special Topics in Crime, Law, and Deviance

3 units. *Land, Simpson, or Wilson*

224S, A-F. Proseminars in Population Studies. Selected topics.

- A. Population Dynamics
- B. Mortality, Morbidity, and Epidemiology
- C. Urbanization and Migration
- D. Demography of the Labor Force
- E. Demography of Aging
- F. Special Topics in Population Studies

3 units. *DiPrete, Land, Maddox, Manton, Myers, O'Rand, Parnell, or Smith*

225S, A-H. Proseminars in Organizations, Markets, and Work. Selected topics in complex organizations, the labor process, and changing occupations.

- A. Basic Concepts, Theories, and Methods
- B. Organizations and Environments
- C. Social Psychology of Organizations
- D. Markets and Market Systems
- E. Careers and Labor Markets
- F. Sociology of Work and Industrial Relations
- G. Special Topics I: Micro Issues

H. Special Topics II: Macro Issues

3 units. *DiPrete, Gao, Janoski, O'Rand, Spenner, or Thornton*

226S, A-G. Proseminars in Social Institutions and Processes. Selected topics in the sociology of institutions and social and institutional behavior.

A. Social Psychology

B. Social Stratification

C. Political Sociology

D. Sociology of Religion

E. Sociology of Science

F. Sociology of Education

G. Special Topics in Social Institutions and Processes

3 units. *Staff*

227S, A-D. Proseminars in Medical Sociology. Selected topics in medical sociology.

A. Social Structure and Health

B. Social Behavior and Health

C. Organization and Financing of Health Care

D. Special Topics in Medical Sociology (for example, social epidemiology, stress and coping, health and aging)

3 units. *George, Gold, Jackson, Lin, Maddox, Thornton, or Weinberger*

228S, A-F. Proseminars in Stratification, Mobility, and Labor Force Behavior. Core and special topics in social stratification, including explanations for the existence, amount, and various dimensions of stratification in society; institutions that produce stratification; forces that cause the structure of stratification to vary both over time and across societies; and structures that govern social mobility within and across generations.

A. Intergenerational Mobility

B. Social Structure and the Life Course

C. Social Inequality and the Structure of Poverty

D. Careers and Labor Markets

E. Societal Transformation

F. Special Topics in Stratification and Mobility Research

3 units. *DiPrete, Lin, Spenner, or O'Rand*

234S. Political Economy of Development: Theories of Change in the Third World.

See C-L: Political Science 234S; also C-L: Cultural Anthropology 234S, History 234S. 3 units. *Staff*

255. Political Sociology. Pluralist, elite, and class theories of the relationship between state and society. Topics include: recent debates on the welfare state, social control, political participation, and state-society relations in socialist economies. C-L: Political Science 255. 3 units. *Smith or Tiryakian*

282S. Canada. See C-L: History 282S; also C-L: Cultural Anthropology 282S, Economics 282S, and Political Science 282S. 3 units. *Staff*

298S, 299S. Seminar in Selected Topics. Substantive, theoretical, or methodological topics. 3 units each. *Staff*

For Graduates

392. Individual Research in Sociology. Students will conduct on an individual basis research designed to evaluate a sociological hypothesis of their choice. The process must be completed by preparation of a report on this research in adequate professional style. Prerequisite: Sociology 207, 208 or consent of instructor. 3 units. *Staff*

COURSES CURRENTLY UNSCHEDULED

216. Advanced Methods of Demographic Analysis

284S. Feminist Theory and the Social Sciences

Institute of Statistics and Decision Sciences

Professor West, *Director* (333 Old Chemistry); Associate Professor Wolpert, *Director of Graduate Studies*; Professors Berry, Sacks, and Winkler; Associate Professors Burdick, Johnson, and Reckhow; Assistant Professors Clyde, Lavine, Müller, Parmigiani, Stangl, and Vidakovic; Adjunct Professor Peterson; Adjunct Associate Professor Wilkinson

The Institute of Statistics and Decision Sciences offers graduate study leading to the Ph.D. degree in statistics. It also offers the M.S. degree to students pursuing a Ph.D. degree in the institute or in another department at Duke. The institute is a regular teaching and research department of the University that is internationally recognized as a center of research in theoretical and applied statistics. The faculty are active in the areas of Bayesian statistics and decision sciences, statistical computing, and interdisciplinary applications of statistics. These areas of faculty interest are reflected in the course of study for students in the Ph.D. program offered by the institute.

Distinguishing features of graduate study are the opportunity for thorough preparation in Bayesian as well as classical statistics, and research opportunities at the interface between statistics, decision sciences, and statistical computing. The institute also enjoys close working relationships and research collaborations with other departments at Duke, and with the National Institute of Statistical Sciences (NISS), providing opportunities for graduate students to become involved in applied projects.

Requirements for the Ph.D. degree in statistics include study of statistics, probability, statistical computing, decision sciences and related areas; passing a comprehensive examination (covering those topics) given at the end of the first year, and a preliminary examination (covering areas of possible research interest) at the end of the second year; and completing a dissertation written under the supervision of a faculty advisor.

For Seniors and Graduates

205. Probability and Measure Theory. Introduction to probability spaces, the theory of measure and integration, random variables, and limit theorems. Distribution functions, densities, and characteristic functions; convergence of random variables and of their distributions; uniform integrability and the Lebesgue convergence theorems. Weak and strong laws of large numbers, central limit theorem. Prerequisites: elementary real analysis and elementary probability theory. 3 units. *Wolpert*

207. Probability. Prerequisite: Mathematics 281 or equivalent. See C-L: Mathematics 290. 3 units. *Staff*

210A. Statistics and Data Analysis for Policymakers. Elements of statistical inference and estimation including exploratory data analysis, regression, and analysis of variance. Emphasis on public policy applications. Not open to students who have had Mathematics 136 or Statistics 110A, 110B, 112, 113, 114, 210B, or 213. C-L: Public Policy Studies 222. 3 units. *Staff*

210B. Statistics and Data Analysis in Biological Science. Elements of statistical inference and estimation including exploratory data analysis, regression, and analysis of variance. Emphasis on biological science applications. Not open to students who have had Mathematics 136 or Statistics 110A, 110B, 112, 113, 114, 210A, or 213. C-L: Environment 251. 3 units. *Staff*

213. Introduction to Statistical Methods. Emphasis on classical techniques of hypothesis testing and point and interval estimation, using the binomial, normal, t, F,

and chi square distributions. Not open to students who have had Statistics 114 or Mathematics 136. Prerequisite: Mathematics 103 (may be taken concurrently) or equivalent, or consent of instructor. 3 units. *Staff*

214. Probability and Statistical Models. An introduction to applied probability and to the parametric probability models commonly used in statistical analysis. The generation of random variables with specified distributions, and their use in simulation. Mixture models; linear regression models; random walks, Markov chains, and stationary and ARMA process; networks and queueing models. Prerequisites: Mathematics 103 and 104 or consent of instructor. 3 units. *Staff*

215. Statistical Inference. Classical, likelihood, and Bayesian approaches to statistical inference. Foundations of point and interval estimation, and properties of estimators (bias, consistency, efficiency, sufficiency, robustness). Testing: Type I and II errors, power, likelihood ratios; Bayes factors, posterior probabilities of hypotheses. The predictivist perspective. Applications include estimation and testing in normal models, exponential families, regression and one-way ANOVA, contingency tables. Hierarchical normal models; model choice and criticism. Prerequisite: Statistics 213 or co-registration in Statistics 214 or consent of instructor. 3 units. *Staff*

216. Generalized Linear Models. Likelihood-based inference in generalized linear models (GLIMs). Multiple linear regression, theory, and practice. Elements of Bayesian analyses of linear models. Theory of likelihood-based inference for GLIMs. Factor variables and cross-classified data arrays. Discrete models: binary regressions and simple contingency tables. Introduction to log-linear models. Data analysis: model fitting, model choice, and residuals-based diagnostics. Prerequisites: Statistics 214 and coregistration in Statistics 215 or equivalent. 3 units. *Staff*

221. Bayesian Inference and Decision. Not open to undergraduates. See C-L: Business Administration 510. 3 units. *Winkler*

226. Statistical Decision Theory. Formulation of decision problems; criteria for optimality: maximum expected utility and minimax. Axiomatic foundations of expected utility; coherence and the axioms of probability (the Dutch Book theorem). Elicitation of probabilities and utilities. The value of information. Estimation and hypothesis testing as decision problems: risk, sufficiency, completeness and admissibility. Stein estimation. Bayes decision functions and their properties. Minimax analysis and improper priors. Decision theoretic Bayesian experimental design. Combining evidence and group decisions. Prerequisite: Statistics 215 or consent of instructor. 3 units. *Staff*

231. Behavioral Decision Theory. Not open to undergraduates. See C-L: Business Administration 525. 3 units. *Payne*

234. Choice Theory. Not open to undergraduates. See C-L: Business Administration 513. 3 units. *Staff*

242. Applied Regression Analysis. Linear regression using both graphical and numerical methods. Model construction, critique, and correction using graphical residual analysis. One-way and two-way analysis of variance; introduction to design of experiments. Use of a standard statistical software package. Applications and examples drawn from various sources, emphasizing the biological and environmental sciences. Prerequisite: Statistics 210B or equivalent. 3 units. *Staff*

244. Linear Models. Multiple linear regression. Estimation and prediction. Likelihood, Bayesian, and geometric methods. Analysis of variance and covariance. Residual analysis and diagnostics. Model building, selection, and validation. Prerequisites: Mathematics 104 and Statistics 113 or 210. C-L: Mathematics 241. 3 units. *Staff*

245. Introduction to Multivariate Statistics. Multinormal distributions, multivariate general linear model, Hotelling's T^2 statistic, Roy union-intersection principle, principal components, canonical analysis, factor analysis. Prerequisite: Statistics 244 or equivalent. C-L: Mathematics 242. 3 units. *Burdick*

253. Applied Stochastic Processes. Prerequisite: Mathematics 135 or equivalent. See C-L: Mathematics 240. 3 units. *Staff*

273. Numerical Analysis. Prerequisites: knowledge of an algorithmic programming language, intermediate calculus including some differential equations, and Mathematics 104. See C-L: Computer Science 250; also C-L: Mathematics 221. 3 units. *Gardner, Greenside, or Rose*

282. Optimization Methods. Optimization techniques useful in decision making. Numerical techniques for nonlinear optimization, with and without constraints; linear and quadratic programming; applications. Other topics, including dynamic programming, optimal control, and stochastic methods, as time permits. Prerequisites: Mathematics 32 and 104 or equivalent, or consent of instructor; knowledge of a computer programming language is helpful but not required. 3 units. *Wolpert*

290. Case Studies in Applied Statistics. Data management and collection, sampling and design, exploratory data analysis, graphical and tabular displays, summarizing data. Case studies from various disciplines such as biostatistics, economics, medical decision making, engineering, and business administration presented by various faculty members. Introduction to applied work through workshops, consultancy, and research literature. Computer orientation, statistical packages and operating systems, graphics, and numerical computing. May be taken more than once. 3 units. *Staff*

291, 292. Independent Study. Directed reading and research. Consent of instructor and director of graduate studies required. 3 units each. *Staff*

293. Special Topics in Statistics. Advanced topics in analysis of variance, design of experiments, nonparametric statistics, foundations of statistical inference. Prerequisite: Statistics 213 or consent of instructor. 3 units. *Staff*

297. Topics in Probability Theory. Prerequisite: Mathematics 290 or consent of instructor. See C-L: Mathematics 293. 3 units. *Staff*

For Graduates

333. Sequential Statistical Analysis. Bayesian analysis of sequential statistical procedures. Multi-armed bandit problems: sampling costs and decision costs, Bayesian updating, myopic rules, dynamic programming. Contemporary design of clinical trials. At the level of Sheldon Ross, *Introduction to Stochastic Dynamic Programming* and part four of Morris H. DeGroot, *Optimal Statistical Decisions*. Prerequisite: Statistics 215 or equivalent. 3 units. *Berry*

345. Multivariate Statistical Analysis. Review of matrix algebra, transformations, and Jacobians. The multivariate normal, Wishart, multivariate t , and related distributions are given special emphasis. Topics such as principal components, factor analysis, discrimination and classification, and clustering treated both from classical and Bayesian viewpoints. Additional topics depending on instructor and background of students. Prerequisites: Statistics 215 and Statistics 216. 3 units. *Staff*

346. Experimental Design and Optimization. Traditional and modern concepts and techniques in statistical design and experimentation. Industrial experimentation and statistical design in complex, high-dimensional control spaces. Fractional factorial designs and highly fractionated experiments. Response surface methodology. Determination of nonlinearities in response surfaces. Efficient allocation of experimental units to control and treatments, especially with small numbers of expensive units. Bayesian

and classical design criteria of optimality. Sequential design and allocation. Prediction from designed experiments. Screening and sensitivity. Data assimilation and tuning. Possible illustrations from studies in semiconductor manufacturing and drug design. 3 units. *Sacks*

356. Time Series and Forecasting. Time series data and models: trend, seasonality, and regressions. Traditional models: EWMA, EWR, ARMA. Dynamic linear models (DLMs). Bayesian learning, forecasting, and smoothing. Mathematical structure of DLMs and related models. Intervention, forecast monitoring, and control. Structural change in time series. Multiprocess models and mixture analysis. Multivariate models, constrained and aggregate forecasting, and forecast combination. Applications using computer software. Other topics, including spectral analysis, as time permits. Prerequisite: Statistics 215 or equivalent. 3 units. *West*

357. Stochastic Processes. Conditional probabilities and Radon-Nikodym derivatives of measures; tightness and weak convergence of probability measures, measurability and observability. Markov chains, Brownian motion, Poisson processes. Gaussian processes, birth-and-death processes, and an introduction to continuous-time martingales. Prerequisites: Statistics 205 (or Mathematics 290) and Statistics 215 (or Mathematics 136.) 3 units. *Wolpert*

365. Survival Reliability Analysis. Statistical models and techniques useful in the comparative study of lifetime distributions. Censoring mechanisms. Empirical and nonparametric methods of survival-curve estimation, graphical methods. Classical, likelihood, and Bayesian inference in parametric models. Survival regression models: proportional and nonproportional hazards models. Accelerated failure time models. Stochastic mechanisms inducing lifetime distributions. Multivariate failures. Competing risks. Multivariate exponential, and other distributions. Mixtures of failure time distributions. Applications in medicine, engineering, economics. Prerequisites: Statistics 215 and 216. 3 units. *Parmigiani, West, or Wolpert*

376. Advanced Modeling and Scientific Computing. An introduction to advanced statistical modeling and modern numerical methods useful in implementing statistical procedures for data analysis, model exploration, inference, and prediction. Topics include simulation techniques for maximization and integration. Prerequisite: Computer Science 221 or equivalent. 3 units. *Müller*

380. Quantitative Methods and Statistics. Review of multivariate calculus, optimization methods, and linear algebra for statistics; introduction to probability and statistics, with emphasis on applications of the theory to applied problems. Not open to students who have taken Statistics 112 or 213. Prerequisite: Mathematics 32, 34, 36 or 41, or consent of instructor. 6 units. *Staff*

381. Nonlinear Regression. Likelihood and Bayesian approaches to model identification (or parameter estimation) and prediction in nonlinear models. Numerical solution of nonlinear optimization problems with and without constraints: derivative-free methods, quasi-Newton methods, successive quadratic programming, stochastic methods (simulated annealing, genetic algorithms). Conditioning, convergence, identifiability problems. Model selection and validation. Applications include growth models, PDE models, pharmacokinetic models. Prerequisites: Statistics 216 and 376 or equivalent. 3 units. *Staff*

386. Noncooperative Game Theory. See C-L: Economics 315; also C-L: Political Science 315. 3 units. *Meurer or Moulin*

390. Statistical Consulting Workshop. Under faculty supervision, students address and solve consulting problems submitted to ISDS's campus-wide consulting program, and present their solutions to the class. May be taken more than once. Consent of instructor required. 1 unit. *Lavine*

COURSES CURRENTLY UNSCHEDULED

203S. Senior Seminar in Statistics

246. Experimental Design

294. Special Topics in Statistics

298. Topics in Probability Theory

The Master of Arts in Teaching Program

Diane Sasson, Ph.D., *Director*

The Master of Arts in Teaching program (MAT) is designed for talented liberal arts graduates who wish to teach their discipline in secondary schools. The MAT degree requires 36 units of graduate credit, consisting of 18 units (six courses) within the student's discipline, six units (two courses) of MAT-specific education courses, and twelve units devoted to a year-long internship/seminar. The program is open to students with strong undergraduate preparation in English, mathematics, the sciences, social studies, or Latin.

More information on the program is available from Dr. Sasson, MAT Director, 138 Social Sciences Building, Box 90093, Duke University, Durham, North Carolina 27706.

302. Educating Adolescents. Focus on understanding the adolescent as a learner. Study of selected theories of adolescent development and theories and principles of educational psychology emphasizing secondary education. Open only to MAT students. 3 units. *Staff*

303. Effective Teaching Strategies. During the first part of the course students learn general teaching strategies for secondary classrooms such as time management, student behavior management, planning for instruction, instructional presentation, designing effective lessons, feedback, promoting critical thinking skills, and cooperative learning. In the second part students work on methodologies in specific subject area groups. Open only to MAT students. 3 units. *Staff*

341. Internship and Reflective Practice. During fall semester MAT students are placed in supervised internships in local high schools under the direction of trained and certified mentor teachers. The accompanying seminar provides students with an understanding of the adolescent as learner, and opportunities for directed reflection on themselves as teachers and learners, and their students as learners. Open only to MAT students. 6 units. *Staff*

342. Internship and Content Methodology. The internship continues through second semester under the supervision and coaching of the mentor. The seminar brings together interns, high school teachers, and content faculty members in specific subject area groups to explore emerging knowledge in the discipline, and the ways that knowledge is best delivered in the high school classroom. Open only to MAT students. 6 units. *Staff*

The University Program in Toxicology

Professor Graham, *Director* (M255 Davison Building); Professor Abou-Donia, *Deputy Director and Director of Graduate Studies* (020 Research Park IV)

The University Program in Toxicology seeks to provide students with a sound theoretical base for a career in environmental toxicology and thorough laboratory training in experimental toxicology. This interdepartmental program brings together students, postdoctoral fellows, and faculty members from various scientific disciplines to interact in the examination of toxicological problems. Faculty members are aligned

with one or more of the following subdisciplines of toxicology: neurotoxicology, the toxicology of oxidative stress, and cell and molecular toxicology. Within cell and molecular toxicology are faculty members with expertise in cancer biology, immunotoxicology, biological toxins, and the reaction of toxicants with cellular macromolecules.

The program faculty is comprised of members from the Departments of Biochemistry, Cell Biology, Chemistry, Microbiology, Neurobiology, Pathology, Pharmacology, and the School of the Environment, including the Duke University Marine Laboratory.

Students seeking a Ph.D. in one of the participating Graduate School departments must make initial application to that department. Students who apply initially for graduate study in one of the departments may also be nominated by that department for admission to the program. Such students should list toxicology as their "Special Field" on the application form. It is expected that most students will have a strong undergraduate preparation in mathematics and the physical and biological sciences with demonstrated excellence of performance as judged by grades in course work and letters of recommendation from former instructors. Each student in the program will take a series of courses in toxicology as well as courses specified by his or her department. A student will be expected to choose a dissertation advisor in his or her department at least by the end of the first two semesters in the program, and will normally be expected to begin dissertation research during the third semester in residence. Upon satisfactorily completing all degree requirements in the program and in the department, students will be jointly recommended for the Ph.D. degree.

Further information may be obtained from the director of the Toxicology Program.

Women's Studies

Professor of the Practice and Adjunct Professor Jean F. O'Barr, *Director* (210 East Duke Building); Professor Carol Meyers, *Associate Director*; Professor Hamilton; Visiting Associate Professor DeLamotte

Graduate and professional students enrolled at Duke University are encouraged to participate in the Women's Studies Program. Participation includes doing graduate level work in women's studies courses, earning a graduate certificate in women's studies, conducting research on gender-related topics, selecting feminist theory and/or women's studies as a prelim area, writing masters' and doctoral theses in feminist scholarship, and attending lectures, seminars, conferences, discussion groups, and other campus events sponsored by the program. Duke University is one of a growing number of graduate institutions to offer a certificate in women's studies at the graduate level.

Graduate students affiliate with the program by submitting, in writing, their intention to take courses and do research on women and gender systems during the course of their studies here. Affiliated students are put on the mailing list and receive calendars, newsletters, lecture notices, and invitations to special events. Soup and sandwich suppers for graduate students are held monthly and take up topics of concern for feminist scholars. A *Guide to Graduate Student Research on Women and Gender*, outlining the work of students affiliated with the program, is published annually. Students wishing to have their name and work listed should contact the program office. An annual research conference organized by the students affiliated with the program is held each year. Information on participation is available in the office. Also available in the office are copies of the Women's Studies Core Bibliography, a collection of recommended texts from feminist scholars across the university, useful for building prelim lists and as an interdisciplinary reference for students' research.

Graduate work in women's studies takes place both in interdisciplinary seminars and in courses offered through departments. In addition to these possibilities, graduate students are encouraged to develop independent study courses, either with a member

of the faculty affiliated with women's studies or in conjunction with the courses offered through the undergraduate Women's Studies Program.

The Women's Studies Program offers a certificate to qualified students in A.M., Ph.D., and professional degree programs of the university. To qualify for the graduate certificate, students must pass a minimum of three graduate level courses on women and gender. Women's Studies 211S, History of Feminist Thought, is the core course for the certificate and the recommended one. The second and third courses are chosen by the student from departmental offerings to build on their disciplinary training and demonstrate a breadth of knowledge about women, culture, and society. Students' course plans are approved by the Women's Studies Advisory Committee as early as possible in their graduate careers. Students in the Divinity School and those earning an A.M. in Liberal Studies have individualized graduate certificate requirements and need to consult the director. The award of the graduate certificate in women's studies is carried on the student's official university transcript upon completion of the work. A recognition ceremony is held each September for students who have earned the certificate.

211S. History of Feminist Thought. A multidisciplinary overview of the rise of feminist scholarship in the disciplines; the investigation of feminist writers prior to the twentieth century; the evolution of women's studies as a discipline, with consideration of pedagogical and methodological questions; an examination of the future contours of feminist scholarship. 3 units. *E. DeLamotte, J. O'Barr, and others*

391, 392. Tutorial in Special Topics. Directed research and writing in areas unrepresented by regular course offerings. Consent of instructor required. 3 units each. *Staff*

COURSES CURRENTLY UNSCHEDULED

283S. Feminist Theory and the Humanities

284S. Feminist Theory and the Social Sciences

COURSES ON WOMEN OFFERED BY DEPARTMENTS AND PROFESSIONAL SCHOOLS

Christian Education 255. History of Women in Methodism. *Felton*
Christian Theology 214. Feminist Theology. *McClintock-Fulkerson*
Cultural Anthropology 215S. The Anthropology of Women: Theoretical Issues. *Staff*
Economics 208S. Economics of the Family. *McElroy*
English 269. American Women Writers. *C. Davidson, Pope, or Tompkins*
English 288. Western in American Culture. *Tompkins*
English 321. Gender and Power in Renaissance Texts. *DeNeef*
English 381. Sex/Gender/Representation: Gay and Lesbian Literary Traditions. *Moon and Sedgewick*
English 381. Ways of Knowing. *Torgovnick*
French 290S. Studies in a Contemporary Figure: Wittig. *Orr*
French 391. French Seminar: Autobiography. *Kaplan*
French 391. French Seminar: The Epistolary Genre. *Farrell*
German 254S. Literature by Women. *Rasmussen*
German 275S. German Women Writers. *Rasmussen*
History 221. Gender and the State in Early Modern Europe. *Neuschel*
History 227-228. Recent United States History: Major Political and Social Movements. *Chafe*
History 351. Colloquium in Women's History. *Staff*
Law 335. Family Law. *Bartlett*
Law 529. Feminist Legal Theory. *Morris*
Literature 254. Introduction to Feminism. *Moi or Radway*
Literature 284. Intellectual as Writer. *Simone de Beauvoir. Moi*
Literature 289. Topics in Feminist Theory. *Moi, Radway, or Tompkins*
Philosophy 203S. Contemporary Ethical Theories. *Lind*
Political Science 200S.A. Contemporary American Feminism. *J. O'Barr*
Psychology 208S. Emotion. *Fredrickson*
Psychology 264S. Gender, Hormones, and Health. *J. Hamilton*
Religion 234. Early Christian Asceticism. *Clark*
Religion 253. Feminist Theory and the Study of Christianity. *Clark and McClintock-Fulkerson*

Zoology

Professor H. Nijhout, *Chair* (227 Biological Sciences); Associate Professor Roth, *Director of Graduate Studies* (226 Biological Sciences); Professors Barber, Forward, Gillham, Klopfer, Laurie, Livingstone, McClay, Nicklas, Rausher, Simons, Staddon, Terborgh, Tucker, Uyenoyama, Vogel, Wainwright, and Ward; Associate Professors Brandon, Rittschof, and K. Smith; Assistant Professors Crenshaw, Fehon, Morris, and Nowicki; Professors Emeriti Bailey, Bookhout, Fluke, Gregg, Schmidt-Nielsen, and K. Wilbur; Adjunct Professor Schmidt-Koenig; Adjunct Associate Professor M. Nijhout

The Department of Zoology manages a variety of programs tailored to individual needs of students seeking the Ph.D. degree. A master's degree may be taken by students en route to the Ph.D., or by those who leave the doctoral program. Ordinarily, only students seeking the doctorate are admitted to the department. In general, students entering the department will be equipped to pursue advanced degrees if they have completed an undergraduate major in biology along with some formal training in college level chemistry, mathematics, physics, and foreign languages. A reading knowledge of one foreign language is required of all doctoral students in zoology.

Nevertheless, in recognition and support of the modern trend toward interdisciplinary research, the department is prepared to accept promising students with less orthodox academic backgrounds and is ready to encourage any student wishing to undertake a program of study leading, in effect, to an interdisciplinary degree sponsored by the department.

Thus, all students are urged to search widely in both the *Bulletin of Duke University: Undergraduate Instruction* and the *Bulletin of Duke University: Graduate School* for information about the intellectual resources of the university. Special attention should be given to announcements of the Departments of Biochemistry, Biological Anthropology and Anatomy, Botany, Cell Biology, Chemistry, Cultural Anthropology, Geology, History, Immunology, Mathematics, Microbiology, Pharmacology, Philosophy, Psychology, Sociology, and Zoology; announcements of the School of Engineering and the School of the Environment should also be consulted.

For Seniors and Graduates

The *L* suffix on a zoology course number indicates that the course includes a laboratory.

201L, S. Animal Behavior. Survey of past developments and current controversies in animal behavior. Extensive readings, followed by individual experimental or descriptive projects in the laboratory or field (or Primate Center). Recommended background: Biology 21L and 22L, Biology 151L, and statistics, or equivalents. 4 units. *Klopfer*

203L. Marine Ecology. Factors that influence the distribution, abundance, and diversity of marine organisms. Course structure integrates lectures, field excursions, and independent research projects. Topics include characteristics of marine habitats, adaptation to environment, species interactions, biogeography, larval recruitment, rocky shores, marine mammals, fouling communities, tidal flats, beaches, subtidal communities, and coral reefs. (Given at Beaufort.) Prerequisite: none: suggested—introductory ecology, invertebrate zoology, or marine botany. C-L: Environment 219L and Marine Sciences. 6 units. *Gerhart (environment)*

206S. Controversies in Biology. A contentious theme for reading, discussion, and an individual or joint paper. Illustrative past topics: the nature of the creative process, causality in biological thought, the lack of political impact of many scientific developments. Open to nonmajors. 3 units. *Klopfer*

215. Tropical Ecology. Ecosystem, community, and population ecology of tropical plants and animals with application to conservation and sustainable development. Prerequisite: a course in general ecology. C-L: Botany 215 and Environment 217. 3 units. *Terborgh*

216L. Limnology. Lakes, ponds, and streams; their origin, development, geochemistry, energy balance, productivity, and the dynamics of plant and animal communities. Laboratory includes field trips. Offered biennially. Prerequisites: Biology 21L and 22L, and Chemistry 12L and Mathematics 32 and physics; or equivalents; or consent of instructor. 4 units. *Livingstone*

222L. Entomology. The biology of insects: diversity, development, physiology, and ecology. Field trips. Prerequisite: introductory biology. 4 units. *H. Nijhout*

229L, S. Paleocology. Global change over the last two million years. Prerequisites: two semesters of biology or geology; and one semester each of calculus, chemistry, and physics; or consent of instructors. C-L: Botany 229L. 3 units. *Bush, Clark, and Livingstone*

234S. Problems in the Philosophy of Biology. Consent of instructor required. See C-L: Philosophy 234S; also C-L: Botany 234S. 3 units. *Brandon*

237L. Systematic Biology. Theory and practice of identification, species discovery, phylogeny reconstruction, classification, and nomenclature. Prerequisites: Biology 21L and 22L or equivalents. C-L: Botany 237L. 3 units. *Baldwin (botany)*

244. Principles of Immunology. Prerequisites: Biology 160 and Chemistry 151L or equivalents. See C-L: Immunology 244. 3 units. *Kostyu (immunology), McClay, and staff*

249. Comparative Biomechanics. The structure and operation of organisms in relation to the mechanics of solids and fluids, including readings from the primary literature. Not open to students who have taken Biology 149. Prerequisites: Mathematics 31 and Physics 51L or equivalents. 3 units. *Vogel and Wainwright*

262. Biology of Parasitism. How parasites, from viruses through vertebrates, have solved the special problems associated with their dependence on other organisms. Emphasis on life cycles, host-parasite interactions, and experimental parasitology. Prerequisites: Biology 22L and 160 or equivalents. 3 units. *M. Nijhout*

267L. Community Ecology. Mechanisms that determine the distribution and abundance of plants and animals: geology, climate, physiography, soils, competition, predation, and history. Lectures focus on ecological principles. Seminars and weekend field trips. Prerequisites: an introductory ecology course and consent of instructor. C-L: Botany 267L. 3 units. *Clark*

269. Advanced Cell Biology. Structural and functional organization of cells and their components with emphasis on current research problems and prospects. Prerequisite: introductory cell biology or consent of instructor. C-L: Botany 269, Cell and Molecular Biology 269, Cell Biology 269, Immunology 269, and Microbiology 269. 3 units. *Siedow and staff*

274L. Biology of Marine Invertebrates. Structures, functions, and habits of invertebrate animals under natural and experimental conditions. Field trips. Not open to students who have taken Biology 176L. (Given at Beaufort.) Prerequisites: Biology 21L and 22L or equivalents. C-L: Environment 297L and Marine Sciences. 6 units. *Staff*

281. DNA, Chromosomes, and Evolution. The relationship of chromosome and DNA-sequence organization with evolution; karyotype changes and speciation; repetitive DNA, split genes, transposable elements, and evolutionary mechanisms; phylogeny reconstruction; evolution of mitosis and the chromosome cycle. Prerequisite: an

introductory course in genetics or cell or molecular biology, or consent of instructor. C-L: The University Program in Genetics. 3 units. *Laurie and Nicklas*

283. Molecular Genetics of Organelles. Genetics, biochemistry, and molecular biology of the organelles of eukaryotic cells, and cellular symbionts. Emphasis on recent literature. Prerequisite: introductory genetics. C-L: Botany 283 and The University Program in Genetics. 3 units. *Boynton (botany) and Gillham*

284. Molecular Population Genetics. Theoretical and computational basis of evolutionary biology at the sequence level. Models of nucleotide and amino acid substitution; distance measures; distance methods for phylogeny reconstruction; tests of neutrality, adaptive selection, and hitchhiking; methods for distinguishing between common ancestry and adaptation; case histories of molecular evolution. For graduate students and upper-level undergraduates with coursework in genetics or evolution or mathematics. 3 units. *Uyenoyama*

286. Evolutionary Mechanisms. Prerequisites: Biology 21L and 22L, and Biology 180 or equivalents. See C-L: Botany 286; also C-L: The University Program in Genetics. 3 units. *Antonovics (botany), Rausher, and Uyenoyama*

287S. Macroevolution. Evolutionary patterns and processes at and above the species level; species concepts, speciation, diversification, extinction, ontogeny and phylogeny, rates of evolution, and alternative explanations for adaptation and evolutionary trends. Prerequisites: Biology 21L and 22L or equivalents. C-L: Biological Anthropology and Anatomy 287S and Botany 287S. 3 units. *Roth*

288. Mathematical Population Genetics. Principles of formulation and analysis of dynamic mathematical models of genetic evolution. Rotating topics include: mating systems, sex ratio, stochastic processes. Prerequisites: calculus; statistics and linear algebra recommended. C-L: The University Program in Genetics. 3 units. *Uyenoyama*

289L. Methods in Morphometrics. Techniques for the acquisition and analysis of quantitative data for describing and comparing biological form. Topics include: image capture and analysis, two- and three-dimensional digitization, and multivariate and geometric techniques such as allometric analysis, outline and landmark-superposition methods, and deformation models. Background in statistics and linear algebra recommended. 3 units. *Mercer*

290. Pattern and Process in Vertebrate Development. Prerequisites: course in comparative or human anatomy and consent of instructor. See C-L: Biological Anthropology and Anatomy 290. 3 units. *Smith*

295S, 296S. Seminar. Topics, instructors, and course credits announced each semester. Variable credit. *Staff*

For Graduates

353, 354. Research. To be carried on under the direction of the appropriate staff members. Hours and credit to be arranged. C-L: Marine Sciences. Variable credit. *Staff*

360, 361. Tutorials. An approved academic exercise, such as writing an essay or learning a research skill, carried out under the direction of the appropriate staff members. Hours and credit to be arranged. Variable credit. *Staff*

364. Ungraded Research. To be carried on under the direction of the appropriate faculty members. Hours to be arranged. Variable credit. *Staff*

COURSES CURRENTLY UNSCHEDULED

355, 356. Seminar

Special Study Centers, Programs, and Opportunities



Center for the Study of Aging and Human Development

The center is a multidisciplinary program devoted to research, training, and clinical activities in gerontology and geriatrics. Although the center does not offer degrees, the varied programs, research laboratories, and clinical settings provide a context and resource for undergraduate and graduate students and for health professionals with special interests in adult development and aging. The center conducts multidisciplinary, two-year programs for postdoctoral fellows interested in focused training for independent research on many varied aspects of aging and adult development. Resources of this all-university program include data from two longitudinal studies, a wide range of archival data of special interest to social scientists, a human subjects registry, and the center's basic and applied research laboratories. A division of geriatrics coordinates research, training, and services related to the care of older adults. Undergraduate and graduate students of the University are welcome to inquire about participation in all programs at the center. Inquiries should be addressed to Harvey Jay Cohen, M.D., Director, Duke University Center for the Study of Aging and Human Development, Box 3003, Duke University Medical Center, Durham, North Carolina 27710.

Asian/Pacific Studies Institute

The institute sponsors an agenda of visiting speakers and scholars and coordinates study abroad programs in China and Japan. A limited number of fellowships are granted which provide stipends for a two-year period. Incoming graduate students with the Ph.D. as their objective, students in good standing in the first year of study in Duke professional schools, and current Duke students enrolled in Ph.D. programs may be considered for these fellowships. Additional one-year fellowships are available for incoming students with a concentration on China. Further information may be obtained from the Asian/Pacific Studies Institute, 2111 Campus Drive, Box 90411, Duke University, Durham, North Carolina 27708-0411.

Center for Biochemical Engineering

The Center for Biochemical Engineering offers a broad and versatile education in the application of engineering principles to problems involving living cells and their

biochemical products. Students follow a course of study that integrates advanced principles of biochemical and process engineering with cell biology, microbiology, biochemistry, and genetics. The center emphasizes the Ph.D., although M.S. and interdisciplinary undergraduate programs are available. The detailed program is tailored to each student's interests and background. Students with either engineering or scientific undergraduate degrees are encouraged to apply to the graduate program. Additional information may be obtained from the Director of Graduate Studies, Center for Biochemical Engineering, School of Engineering, Duke University, Durham, NC 27706.

Canadian Studies Program

The Canadian Studies program offers a certificate of graduate study. The requirements for the certificate include completion of three Canadian Studies courses, including the core course, Interdisciplinary Studies Course 282, Canadian Issues. The other two courses may be from existing courses, or from independent studies with the center's faculty. In addition, the dissertation must be written on a Canadian or Canadian-comparative topic. The student must also demonstrate a knowledge of French or one of Canada's aboriginal languages.

The Canadian Studies Program is supported in part by grants from the U.S. Department of Education, and by occasional funds from the departments of Canada's provincial and federal governments. Its purpose is to formalize and expand the interest of graduate students in Canada, to introduce the study of Canadian life and culture at the undergraduate level, and to encourage such study in primary and secondary schools.

The program awards a limited number of graduate fellowships and teaching assistantships for the study of Canada to American residents. Fellows must work on a Canadian dissertation topic within their disciplines and must also study French. Grants of travel aid for field research in Canada are also offered.

The program sponsors lectures by Canadian specialists and supports seminars devoted to Canada. Opportunities for study in Canada are offered to honors undergraduates in Canadian Studies, graduates, and faculty.

Inquiries should be addressed to the Director, Canadian Studies Center, Duke University, Box 90422, Durham, North Carolina 27708-0422.

Center for Documentary Studies

This interdisciplinary center for research, teaching, and the dissemination of documentary work is dedicated to encouraging and supporting the work of photographers, filmmakers, historians, journalists, novelists, and others who work by direct observation and participation in the lives of individuals and communities. The center is currently focusing on four areas of research: the American family, African American life and race relations, law and politics, and ecology and the environment. The center offers courses under the auspices of several Duke departments including History, Public Policy Studies, Education, and English, and a variety of center-sponsored projects offer a limited number of assistantships to graduate students in the arts and humanities. For more information contact Iris Tillman Hill, Director, Center for Documentary Studies, Lyndhurst House 1317 West Pettigrew Street, Box 90802, Durham, North Carolina 27708-0802.

Center for Health Policy Research and Education

The Center for Health Policy Research and Education provides a focal point at Duke for educational activities in health policy. The center faculty focus their scholarly work on health policy development and implementation, and the center supports the Duke community by facilitating academic collaboration and by providing consulting services to the Duke University Medical Center. Address inquiries to David B. Matchar, M.D.,



Director, Center for Health Policy Research and Education, 125 Old Chemistry Building, Durham, North Carolina 27706.

Center for International Development Research

The Center for International Development Research (CIDR) is one of several active research and training facilities in Duke's Terry Sanford Institute of Public Policy. The center's core faculty are drawn from a variety of academic disciplines, including economics, political science, environmental studies, public policy, business administration, and history. The faculty's teaching, research, and consulting experience are international in scope, encompassing a broad range of development policy issues.

The center offers both long- and short-term programs of study, including the Program in International Development Policy (PIDP). The PIDP provides from one semester to two years of training in policy analysis and problems related to sustainable economic development. Professionals with several years' experience as practitioners or applied researchers in a development-related field are eligible to apply to the program. For additional information, contact the Center for International Development Research, Duke University, Box 90237, Durham, North Carolina 27708-0237.

Center for International Studies

This center is one of the major coordinating units in the university which stimulates dialogue and research on global issues. The center sponsors a number of faculty committees which consider major regions of the world and major analytical themes which are transnational in nature. As a U.S. Department of Education National Resource Center in International Studies, the center sponsors a series of courses on global issues of interest to graduate students. These courses, along with courses in the center's undergraduate major, Comparative Area Studies, also provide opportunities for teaching assistantships for graduate students in the humanities and social sciences. In addition, the center administers a limited number of research awards to graduate students. For more information contact Dr. Josefina C. Tiryakian, Senior Coordinator of Programs, Center for International Studies, 2122 Campus Drive, Box 90404, Durham, North Carolina 27708-0404.

Center for Mathematics and Computation in Life Sciences and Medicine

The Center for Mathematics and Computation in Life Sciences and Medicine was established in 1986 to meet the growing need for quantitative methods in the understanding of complex biological and medical systems. Many important research problems, both basic and applied, now require the collaboration of experimental biologists, mathematicians, and computer scientists. The purpose of the center is to facilitate such collaborations between researchers in different departments and institutions, as well as between academic and industrial laboratories. Address inquiries to Professor Michael C. Reed, Director, Center for Mathematics and Computation in Life Sciences and Medicine, Department of Mathematics, Duke University, Box 90320, Durham, North Carolina 27708-0320.

Center for Slavic, Eurasian, and East European Studies

The graduate school of Duke University offers a program leading to the A.M. and Ph.D. degrees in several disciplines (economics, history, literature, linguistics, and political science), with a concentration in Soviet and East European studies. Students are encouraged to utilize the libraries and facilities of both Duke and the University of North Carolina at Chapel Hill. The holdings of the two libraries in Russian and East

European materials are substantial and complementary. Both libraries have a policy of purchasing all significant published works in Slavic history, economics, government, geography, literature, and linguistics. Other joint activities include periodic colloquia involving the personnel of the two institutions and distinguished visiting scholars.

Students must apply to the director of graduate studies in the department of the discipline in which they wish to specialize. The center administers a limited number of graduate fellowships, and offers an area studies certificate.

For more information, contact Professor Edna Andrews or Vladimir Trembl, co-directors, Center for Slavic, Eurasian, and East European Studies, Center for International Studies, 2122 Campus Drive, Box 90260, Duke University, Durham, North Carolina 27708-0260.

Center for Tropical Conservation

The Center for Tropical Conservation was established to focus the activities of Duke faculty who share a common concern for the human and environmental problems of the tropics. Disciplines represented include, among others, anthropology, botany, economics, forestry, history, political science, and zoology. The center serves to sponsor interdisciplinary courses, seminars, and workshops; to promote and coordinate research relevant to the sustainable development of natural resources; and to gather and disseminate pertinent information. Inquiries should be addressed to Professor John W. Terborgh, Director, Center for Tropical Conservation, 3705-C Erwin Road, Simons Building, P.O. Box 90381, Durham, North Carolina 27708-0381.

Center for Demographic Studies

The center promotes research and training in demographic studies. Its facilities, located at 2117 Campus Drive, include a population library, the Joseph J. Spengler Collection of publications and research materials, and extensive data resources. The center does not offer degrees; it promotes the pursuit of advanced degrees, with a specialization in population studies, through either the Department of Sociology or the Department of Economics. Predoctoral and postdoctoral fellowships are available from the National Institute on Aging sponsored training program in the Social and Medical Demography of Aging. The center's program provides opportunities for direct student participation in ongoing research projects. The program of extramural research stresses, but is not limited to, work in the demography of aging, health, mortality, fertility, and migration.

Inquiries for training opportunities may be directed to Dr. George C. Myers, Director, Center for Demographic Studies, 2117 Campus Drive, Box 90408, Durham, North Carolina 27708-0408.

Program for the Study of Developed Shorelines

The Program for the Study of Developed Shorelines was established in recognition of a critical need for both academic programs and geological research on national coastal issues. The goal of the program is promotion of research, education, and publication concerned with oceanic shorelines already under development. A limited number of graduate research fellowships are available to both M.S. and Ph.D. candidates and postdoctoral support is available for individuals involved in appropriate research. The program is centered both within the Department of Geology and the School of the Environment. Fellows supported by the program must satisfy all departmental requirements. For more information contact Professor Orrin Pilkey, Director, Program for the Study of Developed Shorelines, Department of Geology, Duke University, Box 90228, Durham, North Carolina 27708-0228.

Program in International Development Policy

The Program in International Development Policy (PIDP) is offered through the Center for International Development Research at Duke's Sanford Institute of Public Policy. The PIDP provides from one semester to two years of training in policy analysis and problems related to sustainable economic development. Most participants in the program—known as PIDP Fellows—have at least five years' experience as practitioners or applied researchers in a development related field. They represent diverse nationalities, academic interests, and professional backgrounds.

The PIDP admits both degree and non-degree (that is, certificate) participants. Degree candidates normally spend two academic years fulfilling the requirements for the Master of Arts in Development Policy. Participants with a significant amount of previous graduate-level course work may be eligible to complete the M.A. in one year. For further information and application materials, contact the Program in International Development Policy, Duke University, Box 90237, Durham, North Carolina, 27708-0237.

Council on Latin American Studies

The Council on Latin American Studies oversees and coordinates graduate education in Latin American studies, and promotes research and dissemination of knowledge about the region. Chaired by Dr. Deborah Jakubs, the council is made up of Latin Americanist faculty and staff members representing Arts and Sciences disciplines as well as the professional schools. The council sponsors two speakers series: one provides a forum for talks by Duke and UNC faculty and graduate students, the other organizes presentations by visiting Latin Americanists from throughout the U.S. and overseas. The council also runs an annual research and travel grant competition for graduate students and junior faculty with funding from the Tinker Foundation.

The council and the Graduate School offer a certificate in Latin American Studies to student in M.A. and Ph.D. programs who fulfill the following specific academic requirements:

1. six graduate courses on Latin America;
2. an approved thesis or departmental equivalent on a Latin American topic; and
3. a demonstrated reading knowledge of Spanish, Portuguese, or other language of the region.

Graduate students interested in obtaining a certificate in Latin American Studies should contact the Council Chair or Program Coordinator, Council on Latin American Studies, Center for International Studies, 026 Old Chemistry Building, Box 90255, Duke University, Durham, NC 27708-0255.

Program in Political Economy

The Graduate School offers a Certificate in Political Economy. The certificate is awarded to graduate students in the Departments of Economics and Political Science who successfully complete a series of courses designed to provide interdisciplinary training. Completion of the certificate should enable a student to teach and conduct research in the field of political economy. Work in this field should also be sufficiently compatible with the student's departmental training to enable students to present themselves on the market with the disciplinary credentials to secure an academic appointment.

To earn the Certificate in Political Economy, a student must successfully complete a minimum of five courses, three of which are to be drawn from the core courses and two from a specialized area. One of the three core courses and two of the five courses overall must be in economics, taken in the Department of Economics, the Fuqua School of Business, or the Institute of Public Policy. All of these courses must be at the graduate level, unless an exception is approved by the program director.

All students seeking the certificate are also required to complete successfully at least two courses within the following fields of specialization: Individual and Social Choice; Normative Political Theory and the History of Economic Thought; and Governments and Markets.

For additional information, contact Professor Peter Lange or Professor Hervé Moulin, Duke University, Department of Political Science, 214 Perkins Library, Durham NC 27708--90204, 919/660-4300.

Medical Historian Training Program

The Medical Historian Training Program is conducted under the auspices of the School of Medicine and the Graduate School. The M.D.-Ph.D. program requires a minimum of six years of graduate and medical study, and the M.D.-A.M. four or five years, depending on the use of summer terms. The M.D.-Ph.D. program is intended for those students who know that their major career effort will be in teaching and other scholarly activities in the history of medicine (not necessarily to the total exclusion of clinical medicine). The M.D.-A.M., on the other hand, is appropriate for those who are undecided, but who wish to acquire a firm foundation for future study. In both programs the first two years and the last year will be spent in the medical school. All requirements for the Ph.D. and the A.M. must be completed before the final year of the M.D. program.

Application and Admission Procedures. Applicants must meet the requirements for admission to the School of Medicine and the Graduate School in the Department of History including the MCAT and GRE exams. Those candidates holding the M.D. degree will be considered for the Ph.D. and the A.M. degrees. Candidates who have completed two years of medical school will also be considered for either degree.

Applicants should complete and submit an application to the Graduate School for admission to the Department of History.

Additional information may be obtained by writing to Dr. Peter English, Box 3675 Duke University Medical Center, Duke University Durham, North Carolina 27710.

Medical Scientist Training Program

The Medical Scientist Training Program, conducted under the auspices of the Graduate School and the School of Medicine, is designed for students with a strong background in science who are motivated toward a career in the medical sciences and academic medicine. It provides an opportunity to integrate graduate education in one of the sciences basic to medicine with the clinical curriculum of the School of Medicine. The program usually requires six to seven years of study and leads to both the M.D. and Ph.D. degrees. Although the special emphasis of this program is on basic medical science, the trainees, because of their education in clinical medicine, have a remarkable range of career opportunities open to them. Graduates of this program generally follow one of two broad paths. Some directly pursue careers in teaching and research in one of the basic medical sciences, while maintaining strong ties with clinical science as a result of their combined training; others enter residency programs before pursuing investigative and teaching careers in clinical medicine, carrying with them strong academic backgrounds in the basic sciences.

Eligibility. Applicants must meet the admission requirements of both the Graduate School as a candidate for the Ph.D. degree and the School of Medicine as a candidate for the M.D. degree. Most candidates apply for admission to the first year of the program, but applications are sometimes accepted from students who are enrolled in appropriate stages of their curriculum in the Graduate School or School of Medicine of Duke University. In addition to the minimum requirements for acceptance in the Graduate School and the School of Medicine, advanced course work in science and mathematics as well as prior research experience count heavily in the selection of candidates.

Financial Support. Students admitted to the first year of the program can receive a traineeship award, consisting of a stipend and full tuition allowance, provided by a grant from the National Institutes of Health. The present annual stipend is \$12,000. Current policy of the National Institutes of Health limits the duration of the traineeship to six years, but the years need not be consecutive; this permits curricula which take more than six years. For those students requiring more than six years, the department and/or preceptor of the student provide support for additional years in training.

This traineeship, created by the National Research Service Award Act of 1974 (PL 93-348) provides (as do all research training awards under this act) for certain alternate service or payback requirements in the event that a research career is not pursued. Support by the NIH under the National Research Service Award Act requires the recipient to be a citizen or resident of the United States.

The Training Program. This program has been designed to offer trainees latitude in the selection of course material. Basic requirements are two academic years composed of the first basic science year and the second clinical science year of the curriculum for medical students at Duke University. Following completion of the second year, the trainee enters the graduate program to complete the requirements for the Ph.D. degree. A final academic year of elective clinical study is necessary to complete the requirements for the M.D. degree. Both degrees are awarded at the completion of this sequence.

Additional information may be obtained by writing Professor Salvatore V. Pizzo, Medical Scientist Training Program, Department of Pathology, Box 3712 Duke University Medical Center, Durham, North Carolina 27710.

Oak Ridge Associated Universities

Duke University is one of the sponsoring universities of the Oak Ridge Associated Universities located at Oak Ridge, Tennessee. The graduate research program at Duke has available to it all the facilities of the Oak Ridge National Laboratory and the cooperative supervision of student research by the staff at Oak Ridge. Fellowships in several fields of science are available to qualified applicants.

Graduate Fellowship Program. On application by a university, ORAU awards fellowships to candidates for the master's and doctor's degrees. The student uses the fellowship to conduct thesis research in certain federal laboratories.

The application deadlines depend upon the fellowship. Further information may be obtained from the Office of Research Support, 01 Allen Building.

Office of Research Support

The Office of Research Support, located in 01 Allen Building, provides assistance to faculty members who seek external funding for research and other projects and to graduate students who seek graduate fellowships. The office houses a library of reference materials dealing with external funding. The ORS library contains fellowship and grant information for faculty, postdoctoral fellows, and graduate students from a variety of sources. It is arranged primarily by discipline and also includes such categories as "study abroad" and "dissertation support." Graduate students may take advantage of the resources of the office by browsing through the information on their own or they may make an appointment to talk with the staff by calling 684-3030. The office also reviews all grant proposals submitted to external funding sources, negotiates with the agency, and processes the award. Office hours are from 8:30-5:00 daily.

Center for Resource and Environmental Policy Research

The Center for Resource and Environmental Policy Research at Duke University is committed to the study of public policies on natural resources and the environment. Housed

in the School of the Environment, the center promotes and coordinates research by faculty and students in the School of the Environment and other schools and departments at Duke and at other universities to provide a center of excellence for the analysis of contemporary resource and environmental policy issues. The center offers a forum for the examination of public and private responsibilities for natural resources and the environment and provides a means to link the specialized knowledge of academia with the information needs of government, industry, and international agencies.

Among the subjects now under study are corporate environmental policies, valuation of forests and other natural resources, forest policy, and management of tourism in the United States and in developing countries.

For further information, write to the Center for Resource and Environmental Policy Research, Duke University, Box 90328, Durham, North Carolina 27708-0328.

Organization for Tropical Studies

Duke University is a member and the administrative home of an international consortium which provides leadership in education, research, and the wise use of natural resources in the tropics. The basic OTS course, *Tropical Biology: An Ecological Approach*, lasts for eight weeks (January-March and again in July-August). An eight-week course in *Tropical Managed Ecosystems* is also offered in July-August, and a three-week course, *Tropical Diversity*, is conducted in August. Similar courses are conducted in Spanish for Latin Americans.

Application information and forms, as well as fellowship applications for research travel and subsistence are available through the faculty representatives. Consult Professor William Ascher (political science) or Professor Daniel Richter (environment) for information.

Center for Research on Women

The Duke-UNC Center for Research on Women was founded in 1982 as a collaborative endeavor between Duke University and the University of North Carolina at Chapel Hill to promote women's studies scholarship and research throughout the tri-state area of North Carolina, South Carolina, and Virginia; to support curriculum development in women's studies; and to disseminate women's studies research and information throughout the South. The center's principal focus is to explore the interacting dynamics of gender, race, and class, with a particular emphasis on the American South.

The center offers a limited number of unpaid visiting scholar affiliations, and opportunities for graduate student internships. Regular activities include an annual visiting lectureship series; a working paper series, *Southern Women: The Intersection of Race, Class and Gender*, published jointly with the research center at Memphis State University; the publication of a biannual newsletter, *Branches*; and sponsorship of conferences, colloquia, and community events.

The research center is located at 338 Carr, Building, Box 90719, (919) 684-6641, on the Duke campus, and at 03 Caldwell Hall, C.B.# 3135 at UNC, (919) 966-5787. Dr. Jacquelyn Dowd Hall is the academic director and Christina Greene is the project director.

Program in Integrative Biology

The Program in Integrative Biology is an interdepartmental program that encourages students to think broadly and synthetically about problems of interest to biology, and to use the methods and approaches of several different biological disciplines in their solution. The program provides a counterpoise to the increasing narrowness of specialization that has characterized training in many subdisciplines of biology. Breadth of knowledge and an integrative approach to problem solving in such areas as development and evolution, systematics, functional morphology and biomechanics, neurobiol-

ogy and behavior, and other cross-disciplinary fields, are established by close interaction with participating faculty members and by participation in seminars, workshops, and discussion groups. Graduate students in the program have access to research laboratories of the participating faculty members as well as such research facilities as the Morphometrics Laboratory, the Botany Greenhouses, the Fluid Flow Facility, the Primate Center, the Duke University Marine Laboratory, various vertebrate and invertebrate collections, the Botany Herbarium, the Duke Forest, and the Zoology Field Station. For more information, contact Professor Frederik Nijhout, Program in Integrative Biology, 226 Biological Sciences Building, Duke University, Durham, North Carolina 27706. (919) 684-2507 or (919) 684-3583.



Resources for Study



The Libraries

The libraries of the university consist of the William R. Perkins Library and its seven branches on campus: Biology-Forestry, Chemistry, Lilly, Engineering, Music, Mathematics-Physics, Special Collections; the Pearse Memorial Library at the Duke Marine Laboratory in Beaufort; and the independently administered libraries of Divinity, Law, Medicine, and Business (Fuqua). As of June 1993, these libraries contained over 4,200,000 volumes. The collection includes 9.5 million manuscripts, and over 2,000,000 public documents.

The William R. Perkins Library. The William R. Perkins Library, the main library of the university, houses books, journals, and online resources supporting the humanities and social sciences, as well as a large collection of United States federal and state documents, public documents of many European and Latin American countries. The library is a depository for U.S., North Carolina, and European documents. An international focus is evident throughout the library collections, reflecting the global strengths of area programs at the university. Included are extensive research collections from and about South Asia, Latin America, Africa, Europe, Russia, and Poland, as well as the country's largest collection of Canadiana. The East Asian Collection offers resources in Japanese, Chinese, and Korean on a variety of topics, predominantly history, politics, literature, and language. The newspaper collection includes many eighteenth-century titles; strong holdings of nineteenth-century New England papers; and antebellum and Civil War papers of North Carolina, South Carolina, Virginia, and Georgia; as well as many European and Latin American papers.

The Special Collections Library holdings range from ancient papyri to records of modern advertising. They number more than 150,000 printed volumes and more than 9.5 million items in manuscript and archival collections. They support research in a wide variety of disciplines and programs, including African-American studies, anthropology, classics, economics, history, literature, political science, religion, sociology, and women's studies. Areas of particular strength in the collections include the history and culture of the American South, English and American literature, history of economic theory, British and American Methodism, and the history of modern advertising.

The Circulation/Reserves Department houses the required reading materials placed on reserve for most graduate and undergraduate courses. The department is phasing in campus online access to reserve readings.

The Lilly Library houses the university's principal collections of the visual arts and art history, drama, and philosophy. The Lilly Library is also the location of the Paul B.

Williams Multimedia Broadcast Center. This state-of-the-art facility features remote transmission facilities for the campus as well as the film and videocassette collection. The Music Library, located in Room 113 of the Mary Duke Biddle Music Building, and the Music Media Center, located in Room 027 of the same building, are administered as a single branch library within the Perkins library system. The Music Library contains a rapidly expanding collection of scholarly reference materials, books on music, music scores, and over 200 journals in the field. The Music Media Center has a collection of over 17,000 media items, including compact discs, cassettes, LP recordings, laser discs, and videotapes, plus a collection of over 10,000 microforms, along with various facilities for listening and viewing. The branch libraries serve the academic disciplines bearing their names. The Lilly Library on East Campus, however, contains a small general and reference collection, as well as the university's principal collections of art and art history materials.

The libraries at Duke, the University of North Carolina at Chapel Hill, and North Carolina State University are connected by a computer network. Members of the Duke community can easily and quickly determine what books and other library materials are held by UNC and NCSU. Through a reciprocal borrowing agreement, faculty and students at Duke may borrow materials from both of these libraries.

Reference librarians are on duty in Perkins Library for most of the hours the library is open. Their primary responsibility is to assist patrons in making the most effective use of library collections and facilities. In addition to answering specific questions, the reference librarians also help patrons access information by identifying and explaining the use of library sources and by giving formal and informal instruction to groups of students, faculty, or staff. Professional reference service is available to students in all other campus libraries.

Tours of the Perkins Library are given frequently during Orientation Week and upon request throughout the year. Information about other campus libraries may be obtained from the staff in each of the libraries. The library has both facsimile and copying services. The rules with regard to copyright and a schedule of fees for reproduction services are available in the library at the point of service.

THE MEDICAL CENTER LIBRARY

The Medical Center Library, located in the Seeley G. Mudd Communications Center and Library Building, provides services and informational resources necessary to further educational, research, and clinical activities in the medical field. In addition to the faculties and students in the Schools of Medicine, Allied Health, and Medical Center graduate departments, the library serves the professional and technical staffs of Duke Hospital as well as other health professionals throughout North Carolina. Over 260,000 volumes are available; approximately 3,000 journal subscriptions are received currently, in addition to extensive back files of older materials. Professional reference librarians are available for assistance in the use of library resources, and arrangements may be made for individual or group tours, instruction, or specialized seminars.

The History of Medicine Collections, including the Josiah C. Trent Collection, consist of rare books and manuscripts and a supporting group of histories, biographies, bibliographies, pictures, and ephemeral materials. The rare books are available to all, but are restricted to library use. Most modern books may be borrowed. The History of Medicine Collections also include the Duke Authors Collection, which preserves an archival copy of each book published by a member of the Duke medical faculty. The Frank Engel Memorial Collection consists of a small group of books for leisure reading in nonmedical subjects, supplemented by several newspapers and popular magazines. A reserve collection of heavily used books and journals is maintained in the Medical Sciences Branch Library located in the Nanaline Duke Building and covers the fields of biochemistry, genetics, pharmacology, and physiology.

THE SCHOOL OF LAW LIBRARY

The School of Law Library, with over 440,000 volumes, serves both the university and the local legal community. It features comprehensive coverage of basic Anglo-American primary source materials, including nearly all reported decisions of federal and state courts, as well as current and retrospective collections of federal and state codes and session laws. Digests, legal encyclopedias, and other indexing devices provide access to the primary documents. A large section of the library collection is devoted to treatises on all phases of law, as well as history, economics, government, and other social and behavioral sciences relevant to legal research. The treatises are organized in the Library of Congress classification system and are accessible through a public catalog. Special treatise collections are maintained in several subject areas, including the George C. Christie collection in jurisprudence and the Floyd S. Riddick collection of autographed senatorial material. The library is a selective depository for United States government publications, with concentration on congressional and administrative law materials. The library receives the records and briefs from the United States Supreme Court, the Fourth Circuit Court of Appeals, and the North Carolina Supreme Court and Court of Appeals. In addition to its Anglo-American holdings, the library holds substantial research collections in foreign and international law. The foreign law collection is extensive in coverage, with concentrations in European law and business law materials. The international law collection is strong in primary source and treatise material on both private and public international law topics. Undergraduate and graduate students whose course of study requires access to legal literature may use the library. However, access to the library may be restricted during certain times because of accreditation standards.

UNIVERSITY ARCHIVES

The Duke University Archives, the official archival agency of the university, collects, preserves, and administers the records of the university having continuing administrative or historical value. The institutional archives, which also include published material, photographs, papers of student groups and faculty, and selected memorabilia, are available for research under controlled conditions in 341 Perkins Library.

Science Laboratories

Computer ASSIST Center. For a contemporary university, extensive computing resources are essential. At Duke, the Computer ASSIST Center is the organization that works in partnership with members of the university community to enable them to achieve their goals through computing.

The Computer ASSIST Center supports extensive personal computer and Unix workstation services located throughout the campus. There are six Unix workstation laboratories and clusters containing DEC computers, located in the North, Sociology-Psychology, Biological Sciences, Carr, and Engineering buildings. These workstations are connected to two DEC computer servers and six file servers. There are three laboratories of MS-DOS based personal computers housed in North, Perkins, and West Duke buildings, five other clusters of MS-DOS computers, and nine clusters of Macintosh computers spread throughout the campus. All clusters have dot matrix or laser printers and several are connected to the campus network (DukeNet). While there is a slight charge for use of the laser printers, there is no charge for use of the computers. Free e-mail accounts are available for students from Computer ASSIST.

DukeNet is a fiber optics, backbone network, available in most campus buildings, that provides access to the DEC Unix System, to the Perkins Library online catalog, and to other computing resources, both at Duke and nationwide over the Internet network. DukeNet is managed by Network Communications (NetComm) at Duke. Many under-

graduate dormitory rooms are now wired for DukeNet. DukeNet access is also provided by dialing into a terminal server from a PC with a modem.

Other computing facilities available include mainframe services on an IBM ES/9000 provided by the Duke University Computation Center (DUCC) and supercomputing services on a Cray Y-MP and a Kendall Square KSR-1 parallel computer provided by the North Carolina Supercomputing Center (NCSC).

More specific information regarding Duke computing facilities may be obtained by calling the Computer ASSIST Center Consulting Desk at 660-2983, 9:00 a.m. to 5:00 p.m., Monday through Friday.

Botanical and Zoological Laboratories. Facilities for graduate study in the Departments of Botany and Zoology are located on the West Campus together with those of supporting departments (Physics, Chemistry, Geology, and the basic medical sciences). Scientists in Botany and Zoology with common interests are clustered in three buildings. The Biological Sciences building houses systematics, population genetics and evolution, animal physiology and functional morphology; the Duke Phytotron contains plant ecology; and the recently constructed Levine Science Research Center is home for developmental, cellular, and molecular biology as well as the School of the Environment, Computer Science Department, and two basic medical science departments. The three buildings are within in a five-minute walk and maximal interaction occurs between the different groups in Botany and Zoology through seminars, shared instrumentation and collaborative research projects. Special facilities available to botanists and zoologists include animal rooms, greenhouses, darkrooms, refrigerated and controlled environment laboratories, scanning and transmission electron microscopes, a Van de Graaf accelerator, X-ray machines, radiation and radioisotope equipment, a computerized morphometrics laboratory, and other modern research facilities. Extensive facilities for experimentation in environmental control of plant growth are available in the phytotron adjacent to the botany greenhouses.

The herbarium contains approximately 700,000 specimens and includes notable collections of mosses and lichens. Other assets for teaching and research are the Sarah P. Duke Gardens on the West Campus; the eleven-acre experimental plot and field laboratory developed by the Department of Botany; the Duke Forest, comprising 7,700 acres of woodland adjacent to the West Campus; the field station for the study of animal behavior and ecology; and the Duke University School of the Environment Marine Laboratory, an interdepartmental facility located on a small island on the coast at Beaufort, North Carolina, where twenty-two buildings and a small flotilla of ships and boats provide teaching and research facilities for resident graduate students and faculty as well as visiting individuals or groups.

Duke University, through the botany and zoology departments, is a member institution of the Organization for Tropical Studies, Inc., a consortium of universities with field station facilities in Costa Rica that provide opportunities for course work and research in tropical science.

Highlands Biological Station. Duke University holds a contributing membership in the Highlands Biological Station at Highlands, North Carolina, on the southern edge of the Blue Ridge Mountains at an elevation of 4,118 feet. The station and the region offer an excellent opportunity for field studies and some laboratory work. A limited number of qualified students in botany and zoology may make arrangements to carry out research here. Scholarships for advanced study during the summer months are available through the station.

For further information contact Dr. M. D. Rausher, Department of Zoology, Duke University, Durham, North Carolina 27706.

The Phytotron. The phytotron, a national environmental control facility operated for the National Science Foundation, is adjacent to the Biological Sciences Building and is administered by the botany department. The phytotron is an integrated series of



plant-growth rooms, chambers, and greenhouses, with forty-six separately controlled environments providing more than 4,000 square feet of plant-growing space. The factors of the environment controlled in the units to study plant growth include light, temperature, nutrients, carbon dioxide concentration, and humidity. By using the conditions in various day and night combinations, an exceptionally large number of environments can be simulated for testing the growth responses of plants. The phytotron also includes research laboratories and facilities for studying and monitoring the physiological processes of plants as they respond to global environmental change.

Research space in the phytotron is available to graduate students and faculty at Duke and to members of other educational and research organizations. For information concerning the rental of research space, contact James F. Reynolds, Director of the Phytotron, Department of Botany, Duke University, Durham, North Carolina 27708.

Duke Forest. The Duke Forest comprises approximately 7,700 acres of land in five major divisions and several smaller tracts. A ten-minute walk from campus will take one well into many parts of the Durham division, and a network of roads and fire trails make almost all areas of the forest easily accessible.

The forest lies primarily in Durham and Orange counties, near the eastern edge of the piedmont plateau, and supports a cross-section of the woodlands found in the upper coastal plain and lower piedmont of the Southeast. A variety of timber types, plant species, soils, topography, and past land use conditions are represented. Elevations range from 260 to 760 feet. Soils of the region are derived from such diverse parent materials as metamorphic rock of the Carolina slate formation, granite, Triassic sedimentary rock, and basic intrusives.

The forest serves for research in such areas as forestry, zoology, botany, and ecology by faculty and students at Duke and neighboring universities. Background information useful to researchers covers such features as soils, topography, inventory, plantation and cultural records, as well as a bibliography of past and current studies. Current work on problems associated with developmental pressures at the urban-rural interface and integrated approaches to natural resource management have multiplied the value and benefit of the forest. For information contact: Judson Edeburn, Duke Forest Resource Manager, Room 206-A Biological Sciences Building, Duke University, Box 90332, Durham, North Carolina 27708-0332.

Forestry Sciences Laboratory. The Forestry Sciences Laboratory of the USDA Forest Service, Southeastern Forest Experiment Station is located in the Research Triangle Park near Durham. This research organization provides excellent opportunities to complement research conducted by students in the School of the Environment. Specialized research projects in timber investment opportunities, market efficiency, forest soils, insect toxicology, air pollution impacts, and the economics of forestry in developing countries are currently under way at the laboratory. The staff of the laboratory is available for consultation and participation in seminars. Arrangements may be made for students to conduct certain aspects of their research at the laboratory.

Marine Laboratory. The School of the Environment Marine Laboratory, an inter-departmental training and research facility of the university, is located on Pivers Island within the Outer Banks, adjacent to the historic seacoast town of Beaufort, North Carolina, with direct access to the Atlantic Ocean, Cape Lookout National Seashore Park, estuaries, sand beaches, wetlands, and coastal forests. Because of the dynamic collisions of offshore currents, the area provides an excellent opportunity for marine study and research. The laboratory accommodates nearly 3,700 visitors per year, including fifteen to twenty resident graduate students who are involved in year-round activities. (For additional information concerning the graduate program, refer to the section on marine sciences in the chapter "Courses of Instruction" in this bulletin and the current *Bulletin of Duke University: School of the Environment* and the *Marine Laboratory 1994* publication.)

The physical plant consists of twenty-three buildings, including classroom laboratories, six research buildings, four dormitories, a maintenance complex, and a dining hall. The laboratory has skiffs, the R/V *Susan Hudson* training vessel with the capacity to perform small-scale biological, chemical, geological, and physical oceanography, and a 135-foot research and training vessel, the R/V *Cape Hatteras*, which is operated by the Duke/UNC Oceanographic Consortium.

For information concerning teaching and research space, write to the Personnel and Auxiliaries Office, Duke University School of the Environment, Marine Laboratory, Beaufort, North Carolina 28516-9721.

Zoology Field Station. The Zoology Field Station, located less than one mile from campus, provides facilities for the study of penned, free-ranging, and caged animals in a protected wooded area of eighty acres with two ponds. For information regarding research space, write to the Chairman, Department of Zoology, Duke University, Durham, North Carolina 27706.

Primate Center. The Duke University Primate Center is located in Duke Forest about two miles from the main campus. The colony is composed of approximately 550 prosimian primates representing thirteen genera, twenty-two species, and twenty-eight sub-species. This is both the largest and most diversified colony of living lower primates in the world and the world's largest conservation center for primates. The center also houses frozen, preserved, and fossil primate collections. These collections and animals are utilized by faculty members and both graduate and undergraduate students in the Departments of Biological Anthropology and Anatomy, Environment, Geology, Psychology, and Zoology for all qualified research in primate paleontology, prosimian aging, locomotion, cytogenetics, comparative anatomy, behavior, and physiology. Applications for graduate study in one of these areas should be directed to the director of graduate studies of any of the five departments. For information pertaining to the use of the Primate Center, graduate studies, or availability of research space, write to Dr. Kenneth E. Glander, Director, Duke University Primate Center, 3705 Erwin Road, Durham, North Carolina 27705.

Animal Care and Use Program. The animal care and use program serves the research and teaching programs of Duke University. The program is centrally managed by laboratory animal veterinarians in the Division of Laboratory Animal Facilities (DLAR). DLAR maintains a central vivarium, satellite facilities and a farm where laboratory animals are housed. The institutional animal care and use committee monitors the program to ensure the humane care and treatment of animals. Duke University is registered with the United States Department of Agriculture and is fully accredited by the American Association for the Accreditation of Laboratory Animal Care (AAALAC), which assures compliance with standards of NIH.

Experimental Psychology Laboratories. The facilities of the Department of Psychology: Experimental include laboratories to study human memory, perception and cognition in children and adults, classical and operant conditioning in various species, maze learning, and taste and smell in animals and people. There are facilities for animal surgery, autoradiography, photographic darkrooms, histology, and psychophysiology to help relate vision, taste, and smell to brain aspects and to learning, memory, emotion, and development. There also are sound and speech processing capabilities, labs for visual observation of infant's and young children's social interactions, and various facilities for computational modeling. General purpose laboratories are well supplied with computers for various uses. To facilitate new projects, there are woodworking, metalworking, and electronic shop facilities staffed by full-time technicians. Additional facilities are available in the nearby Primate Center and the Duke and V.A. Medical Centers, as well as in area universities and in research companies in the Research Triangle Park.

Chemistry Laboratories. The Department of Chemistry is housed in the Paul M. Gross Chemical Laboratory, a building containing 146,000 square feet of total area. This well-equipped chemical laboratory provides conditions conducive to research in many areas of current interest. Nuclear magnetic resonance facilities include a broad band Varian XL-300, General Electric QE-300, Gn-300 (25 mm wide bore probe) and GN-500 frequency adjustable instruments, a JEOL FX-90Q, and two 60MHz proton instruments. An ESR spectrometer, the Varian E-9, provides an excellent facility for research in electron spin resonance. Mass spectrometric service is provided by a Hewlett-Packard GC-MS system with HPLC/MS capacity, as well as access to a VG-70S high resolution MS with MS/MS capability. X-ray diffraction cameras of all types are available, along with Enraf-Nonius CAD-3 and CAD-4 automatic diffractometers. Numerous instruments of varying sophistication for photoacoustic, fluorescence, infrared, routine FTIR, dispersive infrared, UV, Raman and ORD-CD spectroscopy are available; various laser sources, monochromators, and computerized data acquisition systems are associated with these systems. Some other significant research facilities include T-jump, stopped flow and diode array spectrometers for rapid kinetic studies, a circularly polarized luminescence spectrometer, and an ultra dry lab facility. A variety of preparative and analytical gas and liquid chromatographs are also located in the building and a number of analytical applications of robotic systems are employed. Research in biological chemistry is facilitated by the availability of an autoclave, media prep room, high speed centrifuges, and ultra centrifuges.

Computing facilities in the Department of Chemistry include a VAX 8350 with an associated tape drive and two 456 megabyte Winchester mass storage devices which operate in a multiuser FORTRAN environment. An Evans and Sutherland PS 390 and Tektronics graphics terminals are connected to the system as well as a cluster of DEC terminals. Clusters of Apple Macintosh, IBM, and AT&T PCs, and Sun workstations are also available. The departmental VAX system and many other computers associated with specific research groups are networked via Ethernet, which is linked to the university fiber optic network. Among the resources available via the network are Duke's IBM 4381 mainframe and the North Carolina Supercomputer Center's Cray Y-MP 8/432.

The department has a machine shop and an electronics shop, and has access to the university glass-blowing shop. The facilities of the Duke University Marine Laboratory on the coast at Beaufort, North Carolina, are available for specimen collecting and processing studies of organic chemicals of marine origin. The Department of Chemistry Library, with holdings of approximately 45,000 volumes, is also located in the Paul M. Gross Chemical Laboratory. The library receives 375 current scientific periodicals, 275 serial subscriptions and has a computer facilities for complete information retrieval.

Physics Laboratories. The Physics Building houses research and instruction in the Departments of Physics and Mathematics. Additional space is provided by the adjacent Nuclear Building (TUNL) and Free Electron Laser (FEL) Laboratory Buildings. Graduate students studying in these two departments usually have offices in these buildings.

About half of the physics space is devoted to research laboratories for the department's programs. Special equipment includes: picosecond, dye, carbon dioxide, and far infrared lasers; a 45-MeV electron linear accelerator driving an infrared free electron laser (FEL) and a 1 GeV linear accelerator and high current electron storage ring driving an ultraviolet to soft X-ray FEL; a high-resolution 4 MeV Van de Graaff accelerator; a 20 MeV tandem Van de Graaff accelerator with polarized source and cryogenically-cooled polarized targets; a helium liquefier, cryostats, magnets, and associated equipment for research in the millikelvin temperature range; VAX computers for data collection and processing in nuclear physics and in high-energy physics; various mini-computers and microcomputers in the research groups; a cluster of seven NeXT computers for instructional / research use; and a Sun minicomputer for general departmental use.

The Mathematics-Physics Library is located in the Physics Building; it contains a large selection of books and scholarly periodicals. Also located in the building are appropriately staffed instrument and electronics shops.

Engineering Research Laboratories. The laboratories of the four departments of the School of Engineering contain extensive basic equipment that may be applied in several specialized fields. The facilities available for instruction and research are suggested by the following brief listing of equipment found in each department:

Biomedical Engineering. Biomechanics laboratories: hydraulic testing system, IBM PS/2 microcomputer, micro VAX II computer, optical displacement measuring system, silicon graphics/GE graphcon system, Sun micro systems SPARC station, Zonic modal analyzer. Biomedical materials and surface interactions laboratories: air- and water-cooled Argon lasers, air convection oven, capillary rheometer, FTIR infrared spectrometer, gamma counter, gel permeation chromatograph, Langmuir-Blodgett trough, liquid nitrogen cooled CCD camera, Nikon inverted microscope with phase contrast and epifluorescence, Ultimage image analysis system and Macintosh II, vacuum oven, Zeiss axioplun microscope, electrophysiology and neurophysiology instrumentation. Ultrasound imaging and transducer laboratories; CAD/CAM stations for circuit development, diamond tip dicing saw, high-speed video system, image processing system, laminar flow hood, multiple PCs and work station, PC board maker, ultrasound mechanical scanner, VAX 11/780.

Civil and Environmental Engineering. Faculty in civil and environmental engineering routinely design, construct, and adapt laboratory equipment for specialized teaching and research tasks in engineering mechanics, environmental engineering, geomechanics, structural engineering, transportation and systems engineering, and water resources engineering. In addition, arrays of standard laboratory facilities are available to support each research area.

Research and teaching facilities in engineering mechanics, structural engineering, and geomechanics include four independent closed-loop electrohydraulic dynamic loading systems (MTS), with a frequency range up to 100 Hz, and ranges of load to capacity 6,000, 35,000, 50,000 and 220,000 lbs. The 6,000 lbs. actuator can develop a constant crosshead speed up to 50,000 in./min. For teaching and research, the department has a 10,000 lb. universal testing machine and a 10,000 lb. torsion machine both fully instrumented with computer data storage, as well as a Kistler force plate with 10 decades of sensitivity. Equipment is available for fabricating specimens and testing fiber-reinforced polymer composites. An environmental chamber tests in the temperature range of -100° to $+350^{\circ}$ F; equipment for spectral and modal dynamic analysis, and an ultra-high pressure triaxial shear apparatus is available for confining pressures up to 100,000 psi. Rock-testing facilities, model-testing equipment for anchored walls and penetrometer studies, a large-aperture research polariscope, a reflective photoelastic polariscope, and a sustained-loading facility for long duration in studies of prestressed concrete are routinely used in teaching and research procedures.

Research and teaching facilities in environmental engineering include wet and dry laboratories equipped to study a range of physical, chemical, and biological processes. A fully integrated resource recovery pilot plant, calorimetry for the measurement of heat values of secondary fuels, air classifiers interfaced with computer monitors, as well as indoor and outdoor water resources monitoring devices including flumes, Venturi meters, and digital computation hardware are available. The biotechnology and physical-chemical laboratories are equipped with autoclaves, a media preparation room, walk-in environmental rooms, numerous fume hoods, a biohazard containment facility for cultivation of genetically engineered microorganisms, fully instrumented bioreactors with on-line control, and various analytical instrumentation including liquid scintillation counting, autoradiography, atomic adsorption spectroscopy, total carbon analysis to ppb levels, gas chromatographs equipped with ECO, FID, and TCD detec-

tors, HPLCs, computer-assisted image analysis microscopes, and a recently acquired fourier transfer infrared spectrometer facility.

Computer resources available to civil and environmental engineering students include a multitude of personal computers, two Digital Equipment Corporation Workstation clusters consisting of fifty workstations in total. Additionally, the department houses and maintains its own computing facility, providing five UNIX workstations (1DEC, 1 SUN, and PC's with silicon graphics 486 processors) and 9 IBM-compatible PC's also with 486 processors. This particular facility is dedicated to graduate student research and special undergraduate projects. Most of the computer resources are networked with the School of Engineering's ethernet backbone and are easily accessible from several locations in the department and across the campus. Depending on the specific application, students can successfully investigate problems in computational fluid and solid mechanics, rigid-body dynamics, particle and mathematical optimization as well as transportation and environmental systems engineering research topics. If additional computing capabilities are needed, access to the Microelectronics Center of North Carolina's Cray YMP vector processing supercomputer is available. Numerous software packages are available to students through the existing Computational Resource Center. Many problems addressed by the faculty and students of the Department of Civil and Environmental Engineering are computationally complex and could not be approached without the substantial computing facilities available at Duke.

Electrical Engineering. General computing laboratory equipped with several IBM RS-6000s servers and a fast interconnect network in a UNIX environment for interactive design, graphics, computation, and computer-aided engineering; Sun SPARC workstations for VLSI design; ethernet network for connection to regional, national, and international data networks; Signal Processing Laboratory with Sun workstations; microwave facilities for experimentation up to 35 GHz; robotics with a GE P-50 robot; microprocessor laboratory; Digital Systems Laboratory; solid-state power conditioning laboratories with dedicated computers for controlling instruments, including digital processing oscilloscopes and network and impedance analyzers, and for computer-aided design; clean room and semiconductor nMOS fabrication laboratory for integrated circuits; a molecular beam epitaxy laboratory for III-V compound semiconductor crystal growth using a Riber Model 3R&D MBE system; access to the design, fabrication, and research facilities of the Microelectronics Center of North Carolina; and an ion implanter and MOCVD epitaxial growth system in a III-V compound semiconductor lab at the Research Triangle Institute.

Mechanical Engineering and Materials Science. The department has a number of well-equipped laboratories for studies in aerodynamics, acoustics, nonlinear dynamics and chaos, microscale and convective heat transfer, computational fluid mechanics and heat transfer, control theory, cell and membrane biomechanics, biorheology, polymer engineering, corrosion, electronic materials, physical metallurgy, positron annihilation spectroscopy, and expert systems. Equipment in these laboratories includes a wind tunnel, a scanning electron microscope, a scanning tunneling microscope, doppler broadening and lifetime positron systems, a liquid helium cryostat, DSC/DMA facilities and diffusion furnace, inverted microscopes, low-light-level video cameras and a photon counter, cell-culture systems, an anechoic chamber, a dynamic signal analyzer and laser velocimeter for bearing analysis, an X-ray generator and diffractometer, FTIR spectrometer, a high-power laser with lock-in amplifier, and a fluorescence microscope. A variety of computational equipment is available including a mini-supercomputer access to a regional supercomputer.

F. G. Hall Hypo-Hyperbaric Center. The F. G. Hall Hypo-Hyperbaric Center contains eight hyperbaric and/or hypobaric pressure chambers used to simulate altitude or deep-sea diving conditions, for the purpose of both experimentation and medical treatments. The interconnected steel chambers can simulate depths of 3,600 feet, or altitude of 155,000 feet, a capability unmatched in the United States. In 1982 a research

dive to 2,250 feet set a new world's record. Basic and applied research of this type has led to the development of safer and faster decompression methods, mechanisms of oxygen toxicity together with new treatments for diving accidents and diseases treated with high-pressure oxygen. The laboratory provides opportunities for research and for training for physicians, postdoctorates, and graduate students in pressure-related medicine and physiology. The program is multidisciplinary with major participation by the Departments of Anesthesiology, Medicine, Surgery, Cell Biology, Neurobiology, and the School of Engineering.

The Medical Center. Currently the Medical Center at Duke University occupies approximately 140 acres on the West Campus. The southern quadrant is contiguous with the main quadrangle of the university and consists of the following: Davison Building, Duke Hospital South, Baker House, Barnes Woodhall Building, Diagnostic and Treatment Building, Ewald W. Busse Building, Eugene A. Stead Building, Clinical Research II, and the Edwin A. Morris Clinical Cancer Research Building.

The northern portion includes the Joseph and Kathleen Bryan Research Building for Neurobiology, Nanaline H. Duke Medical Sciences Building, Alex H. Sands Medical Sciences Building, Edwin L. Jones Basic Cancer Research Building, Clinical and Research Laboratory Building, Bell Building, Seeley G. Mudd Communications Center and Library, Joseph A. C. Wadsworth Building (Eye Center), Duke Hospital North Division and Anlyan Tower, and Lenox Baker Hospital.

In the western section of the campus are: Surgical Oncology Research Building; Environmental Safety Building; Research Park Buildings I, II, III, and IV; the Vivarium; and the Cancer Center Isolation Facility.

In the eastern section of the campus are Pickens Rehabilitation Center, Civitan Mental Retardation and Child Development Center, and Trent Drive Hall.

Student Life



Living Accommodations

Duke University has two residential apartment facilities in which graduate and professional students live. These apartments are available for continuous occupancy throughout the calendar year. All of the apartments are completely furnished by the university. An itemization of furnishings is included with the floor plans sent out in the application bulletin. Spaces in apartments for single students are provided on an individual basis with each student paying rent per academic term to the university. This method permits students to share apartments with others of their choice. When this is impractical, the Department of Housing Management strives to place persons with similar interests together.

Town House Apartments. Town House Apartments, located about three blocks from the main East-West Campus bus line, is a thirty-two-unit complex. These apartments are more spacious than most apartments found on campus or in Durham. Because of its location away from the academic facilities, students find that it offers a change from normal campus life and activities.

Each air-conditioned apartment includes a living room, a master bedroom, a smaller bedroom, a bath and a half, and an all-electric kitchen with a dining area. Spacious closets and storage spaces are provided within each apartment. A swimming pool, located in the center of the complex, is open during the late spring and throughout the summer months.

All utilities—water, heat, air-conditioning, gas, and electricity—are provided. Occupants must make arrangements with the local telephone company, GTE, to pay for telephone service. GTE usually requires a deposit when initial application for service is made. The company should be contacted prior to arrival as it usually takes several days to obtain service.

Central Campus Apartments. During 1975, Duke University completed a 500-unit apartment complex. A swimming pool, located in the center of the complex, is open during the late spring and throughout the summer months. Additional facilities include a pub, convenience store, tennis courts, and basketball courts.

All utilities—water, heat, air-conditioning, and electricity—are provided. Telephone jacks are provided in each apartment. Duke University's Tel-Com supplies telephone

service. Central Campus Apartments residents are responsible for providing their own phones and having them connected.

Efficiency, two-bedroom, and three-bedroom apartments are rented to graduate students. Efficiency units are very limited in number and are generally not available to new students.

Application Procedures. When students are informed of their acceptance to Graduate School they will also receive a postcard on which to indicate preference for university housing. This postcard should be returned to the Department of Housing Management. Detailed information on the types of accommodations and application forms will be forwarded to the accepted student. Assignment to all university housing is made on a first-apply, first-assigned basis, and it is not guaranteed.

Off-campus Housing. The Department of Housing Management maintains a listing of rental apartments, rooms, and houses provided by property owners or real estate agencies in Durham. These listings are available in the department only; during the summer an assistant is available to answer questions and aid students in their attempt to obtain housing off campus. Information on commercial apartment complexes in the Durham area may be obtained by indicating a preference for off-campus housing on the postcard which you will receive with your acceptance notice. Except for assuring that owners sign a statement of nondiscrimination, off-campus property is in no way verified and neither the University nor its agents negotiate between owners and interested parties.

The search for accommodations should begin as soon as possible after acceptance to the Graduate School. A visit of two or three days will allow you the opportunity to make use of the off-campus service and to inspect personally the available facilities.

Duke University Marine Laboratory. The Duke University Marine Laboratory, located on Pivers Island, has cottage-type residence halls which are available. Further information may be obtained from the publication *Marine Laboratory 1994*.

Dining Services

Graduate students are encouraged to dine on campus at any Duke Dining Services facility. Dining Services provides cafeterias, restaurants, fast food operations, delis, snack bars, ice cream/dessert shops, and catering services in convenient locations throughout campus.

On West Campus, students are invited to dine in the Blue & White Room (cafeteria), the University Room (cafeteria), the Oak Room (restaurant), the Cambridge Inn (deli, hot foods, salad bar, and dessert shop), the Rathskeller (hamburgers, pasta, and sandwiches), Burger King Cafe (fast foods), and Lick's (ice cream/frozen yogurt). On East Campus, visit the East Food Court (a collection of food shops including L'il Dino Subs, a grill, international food station, salad bar/healthy food shop, pasta area, deli, and a dessert/ice cream shop), the East Union Cafeteria, and the Upper East Side (snack shop). North and Central Campus food service locations include Trent Cafe (hot foods, grill, sandwiches, and desserts) and The Pub on Central Campus (specialty sandwiches, salads, and beverages).

Food purchases may be paid for any one of three ways: by using cash, a dining account, or a flexible spending account. Both the dining account and the flexible spending account allow a student to make purchases on campus by accessing a prepaid account carried on the student identification card, or DukeCard. Information about these DukeCard accounts is available from the Duke Card Office, 024 West Union Building, Box 90911, Durham, NC 27708-0911, (919) 684-5800.

Further information about campus dining service facilities and dining plan options is available from Duke Dining Services, 029 West Union Building, Box 90898, Durham, NC 27708-90898, (919) 660-3900.

Services Available

Student Health Program. The Duke Student Health Program is administered by the Department of Community and Family Medicine, Duke University Medical Center. Medical services are provided by family physician faculty, physician assistants, and nurse-practitioners.

The Duke Family Medicine Center (684-3180), located on the corner of Erwin Road and Trent Drive, is the primary location for medical care. Students are seen by appointment Monday-Friday, 8:00 A.M.-7:30 P.M., Saturdays from 10:00 A.M.-1:30 P.M., and Sundays from 2:00 P.M.-4:30 P.M. A wide variety of services are available: medical care, GYN clinic, health education, sports medicine, laboratory, pharmacy, travel and immunization, x-rays, cold/flu self-help table, allergy clinic, and nutrition counseling.

Students are encouraged to use the Duke Family Medicine Center as their portal of entry to other health resources when needed, including the specialty clinics at Duke University Medical Center. This will help with coordination of appropriate care.

For problems arising after hours, students should call the Infirmary (684-3367). After consulting with the physician on call, the nurse may advise the student to come to the Infirmary or to the Duke Emergency Department (684-2413) for further evaluation. In the event of an obvious life-threatening emergency, students should go directly to the Emergency Department. If necessary, Duke Public Safety (call 911 or 684-2444) will provide on-campus transportation to the Emergency Department or the Infirmary.

The Infirmary (684-3367), located on the fourth floor of Duke University Hospital-South Division, Purple Zone, provides inpatient treatment of illnesses too severe to manage in the residence hall or apartment, but not requiring hospitalization.

The *Health Education* component of Student Health is headquartered at the Trent Drive Hall (684-3620, ext. 325). Health education staff are available, by appointment, to assist students in making informed decisions that promote their health. Topics of concern include alcohol and other drug usage, eating and nutrition, sexually transmitted diseases, stress management, and others. Health education staff are also available on a drop-in basis at the Healthy Devil Health Education Center, Room 113, House 0 in Kilgo quad on West Campus. Free, confidential pregnancy testing and pregnancy options counseling is also available there, by appointment (684-3620, ext. 325).

Sports Medicine Services: The Student Sports Clinic is located on West Campus, in the basement of Card Gym. A physical therapist is available from 3:00-6:00 P.M. weekdays, on a walk-in basis, to assess exercise-related problems, and to outline short-term treatment plans to aid recovery, and help prevent reinjury. The Sports Medicine Clinic is located on the third floor of the Finch-Yeager Building adjacent to Wallace Stadium. There students may be seen by a Student Health physician, by appointment (684-6721).

Counseling and Psychological Services (CAPS; 660-1000), is a complementary service to the Student Health Program. Mental health and career counseling services are available, as detailed in the CAPS brochure.

Confidentiality. Information regarding the physical or mental health of students is confidential, released only with the student's permission.

Health Fee. All currently enrolled full-time students and part-time degree candidates are assessed a Student Health Fee. This covers most services rendered within the Student Health Program (see below) during each enrolled semester. An optional Summer Health Fee for students not enrolled in summer session is also available through the Bursar's Office.

Health insurance is essential to protect against the high cost of unexpected illnesses or injuries which would require hospitalization, surgery, or the services of specialists outside the Student Health Program. All students are strongly encouraged to be certain that they have such insurance. For those not adequately covered by other insurance, the Duke Student Insurance Plan is specifically designed to complement the coverage

provided by the Student Health Fee. Coverage for the student's spouse and dependent children may also be purchased. Further information about this plan may be obtained from the Student Insurance Office (684-6455) or from Hill, Chesson, and Associates (489-7426).

Services Covered by the Health Fee. The health fee covers most of the services at Duke Family Medicine Center if medically indicated and rendered by a student health provider:

- Medical care for acute and chronic illness, and minor injuries;
- One annual health maintenance examination and associated studies;
- Routine laboratory and X-ray services;
- Medications on the approved formulary, as required for short-term treatment of nonchronic conditions;
- Immunizations required for programs receiving academic credit at Duke (a supplemental fee may be required for certain immunizations), excluding pre-matriculation immunizations.

The health fee covers a variety of other services at Duke Family Medicine Center and other locations:

- Health education and health promotion including nutrition consultation;
- Sports medicine, excluding specialists' (orthopaedic) services;
- Infirmity service, excluding meals and diagnostic testing order by specialist consultants;
- Mental health and career counseling at CAPS.

Services not Covered by the Health Fee. If you unsure whether a service is covered, please ask one of the Student Health staff prior to receiving service. You are financially responsible for the following:

- Medical care provided in the Emergency Department, hospital, or other non-student health facility;
- Dental care;
- Pregnancy care or deliveries;
- Tests, procedures, prescriptions not medically indicated or ordered by non-Student Health providers, or not on the approved list of services provided;
- Immunizations required for entrance to Duke or other universities, or for personal travel,
- Medications required for long-term use and contraceptives.

Upon arrival on campus, all students receive a detailed brochure about the program and the services covered by the Student Health Fee.

Career Development Center. The mission of the Career Development Center is to educate the students of Duke University in the arts of self-assessment, career exploration, career planning, and job hunting with the goal of helping them develop rewarding and fulfilling careers. The center primarily serves the students and alumni of Trinity College, the School of Engineering, and the Graduate School.

Career counselors are on staff to help students at Duke begin the process of discovering career interests. The career specialist for graduate student concerns provides specific information and advice to graduate students interested in pursuing academic and nonacademic careers. Other career specialists help students focus on specific career fields, including the arts, business, community service, education, engineering, mathematics, computer science and the physical sciences, government, health and life sciences, higher education, international careers, and mass media.

Programs and services of the center include the credential service, which collects and sends letters of recommendation, the video interviewing program which offers interview training, the on-campus recruiting program offering interviews for permanent positions with a wide variety of national organizations, and DukeSource providing access to alumni/ae advisors in a wide variety of academic disciplines and career fields.

The Career Spectrum, a weekly career page in the *Duke Chronicle*, is designed to keep students aware of current career-related opportunities on- and off-campus. Announcements of job openings, career seminars, workshops, and information sessions appear each week. The Career Library and Job Room provide a wealth of printed and database materials on specific career fields and specific employers. CareerSource, an online computer career database, provides information at computer clusters located throughout the university and is available until midnight on weekdays and twenty-four hours a day over the weekends. Using CareerSource, a student may review bulletins, information about the center, review summer and full-time job listings, and register to participate in center programs.

The Office of Continuing Education also offers career development services, with both individual consultations and group workshops. The office provides help with resume preparation and offers guidance tests, including the Myers-Briggs Type Indicator, a test of personality preferences that allows students to better understand their own personalities, gain insight into differences they experience with others, and begin to look at career fields that fit their personality preferences. The office does charge a fee for these services. For more information, please call 684-6259.

Student Affairs

Cocurricular Activities. Graduate students at Duke University are welcome to use such university recreational facilities as swimming pools, tennis courts, the golf course, and to affiliate with the choral, dance, drama, music, and religious groups. They may become junior members of the American Association of University Professors and may affiliate with Phi Beta Kappa and social fraternities.

A full program of cultural, recreational, and religious activities is presented by the Office of Cultural Affairs, the Duke University Campus Ministry, the Duke University Union, the Office of Student Activities, and recreational clubs. The Duke University Union sponsors a wide range of programs through its committees, which are open to all segments of the campus community. Included are touring Broadway shows; rock, jazz, and pop concerts; speakers; films; a film-making program; the largest fully student-run television station in the country; art exhibits in three galleries; and a broad program in crafts located in Southgate Dormitory and the Bryan University Center. The Aquatic Center and the East Campus Gymnasium pool are available to students, faculty, and staff families. The handball, racquetball, squash, and tennis facilities and the weight room on East and West Campus are also available. Interested students may participate in softball and other team sports.

The University Center complex includes the Bryan University Center, which houses the Information Center, two drama theaters, a film theater, lounges, stores, meeting rooms, games room, the Rathskeller, art gallery, and other facilities; the West Union, which includes dining facilities; and Flowers Building, which includes student publications, Page Auditorium, and the university box office.

Inquiries should be directed to the Recreation Office, 105 Card Gymnasium; the Office of Cultural Affairs, 109 Page Building; Duke Chapel; the Duke University Union, Bryan University Center; or the Office of Student Activities, Bryan University Center.

Full information regarding the scheduling of major events and programs for the entire year will be found in the *Duke University Yearly Calendar*; detailed and updated information for the fall and spring semesters in the *Duke Dialogue*, available each Friday; updated information for the summer session in the *Summer Session Calendar*, published at the beginning of each summer term; and the *Duke Chronicle*, published each Monday through Friday during the fall and spring and each Thursday during the summer. Copies of the Duke University calendars may be obtained at the information desk, Bryan University Center, or the calendar office, Page Building. Also during the summer, the

Summer Session Calendar is published weekly by the summer session office and is available at convenient locations.

Graduate and Professional Student Council. The Graduate and Professional Student Council is the representative body for the students of graduate departments and professional schools. The council provides a means of communication between schools and between graduate students and the administration. The council selects graduate students for membership on university committees. Representatives of each department and officers of the council are selected annually.

Religious Life. The Duke University Chapel, open from 8:00 A.M. until 10:00 P.M., provides a magnificent setting for daily prayer and meditation. In addition, a variety of worship experiences are provided throughout the week including the university service of worship at 11:00 A.M. each Sunday, noonday prayer each weekday during term, and choral vespers each Thursday at 5:15 P.M. The one hundred and fifty-voice Chapel Choir is open by audition to all interested singers. The Graduate and Professional Student Fellowship, sponsored by Duke Chapel, provides ecumenical fellowship as well as service opportunities for interested students. Duke Campus Ministry also invites graduate students to participate in the various religious life groups. Contact the Office of Dean of the Chapel or the Assistant Dean of the Chapel, Duke Chapel, for further details.

Visiting Scholars

The libraries and other facilities of Duke University are made available, to the extent practicable, to faculty members of other colleges and universities who wish to pursue their scholarly interests on the Duke campus. Such visitors are not charged unless they wish to participate in activities for which a special fee is assessed. Inquiries pertaining to visiting scholars should be addressed to the department chairman concerned or the dean of the Graduate School.

Postdoctoral Research

Scholars engaged in postdoctoral research often find it advantageous to use the resources of Duke University during the summer. The university welcomes these visitors and makes living accommodations available to them during the summer sessions from May 9 to August 8. Persons desiring research privileges (library and/or laboratory) should request approval through the department in which the research interests lie or through the Graduate School.



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1994-95

The Fuqua School of Business



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1994-1995

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The information in this bulletin applies to the academic year 1994-95 and is accurate and current, to the extent possible, as of August 1993. The university reserves the right to change programs of study, academic requirements, teaching staff, the calendar, and other matters described herein without prior notice, in accordance with established procedures.

Information that the university is required to make available under the Student Right to Know and Campus Security Acts may be obtained from the Office of University Relations at (919) 684-2823 or in writing to 615 Chapel Drive, Duke University, Durham, North Carolina 27706

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University Administration

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Dean Thomas F. Keller

The Fuqua School of Business Calendar*

Fall 1994

August	
25-27	Orientation and registration
28-Sept. 2	Integrated Learning Experience
September	
5	Term 1 classes begin
October	
14	Term 1 classes end
18-21	Term 1 exams
24-25	Fall break
27	Term 2 classes begin
November	
23-25	Thanksgiving break
December	
9	Term 2 classes end
13-16	Term 2 exams

Spring 1995

January	
8-13	Integrated Learning Experience
16	Term 1 classes begin
February	
24	Term 1 classes end
28-Mar. 3	Term 1 exams
March	
6-10	Spring break
13	Term 2 classes begin
April	
21	Classes end
25-28	Examination period
May	
13-14	Commencement

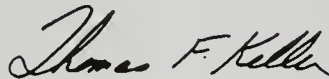
* Dates of the 1994-95 calendar are subject to change by the provost of Duke University during the 1993-94 year.

A Message from the Dean

In his indenture establishing Duke University, James Buchanan Duke called for, among many other components of a research university, a school of business administration. The Board of Trustees of Duke University, in 1969, established the Graduate School of Business Administration with a mandate to provide programs in management education of the highest quality. In 1980 the school was renamed to honor J. B. Fuqua of Atlanta, Georgia, who is an emeritus member of the University's Board of Trustees and an active member of the Fuqua School's Board of Visitors. Mr. Fuqua continues to support the school through his generosity and his participation in its programs.

The mission of the Fuqua School of Business is to provide the highest quality education for business and academic leaders, and promote the advancement of the understanding and practice of management through research. Our approach is to prepare men and women to meet their career opportunities with a strong education which balances generalist and functional skills, as well as with an awareness of the need to balance individual leadership and a sense of team. We seek students who possess high academic standards and demonstrate the ability to think creatively. These are important qualities for business leadership and are reflected in the orientation of our entire program. As a school, we are committed to retaining our flexibility and our responsiveness to management needs as they arise in the business community.

Our heritage at Duke is a tradition of excellence in education. At the Fuqua School we have built on this heritage to develop programs that enable graduates to meet the challenges of leadership in business, government, and educational organizations.



Thomas F. Keller
Dean

General Information



Duke University

In 1839 a group of citizens from Randolph and adjacent counties in North Carolina assembled in a log schoolhouse to organize support for a local academy founded a few months earlier by Brantley York. Prompted, they said, by “no small share of philanthropy and patriotism,” they espoused their belief that “ignorance and error are the banes not only of religious but also civil society which rear up an almost impregnable wall between man and happiness.” Union Institute, which they then founded, was reorganized first in 1851 as Normal College to train teachers, and eight years later as Trinity College, a liberal arts college, which later moved to the growing city of Durham, North Carolina. With the establishment of the James B. Duke Indenture of Trust in 1924, Trinity College became Duke University.

Today, Duke is a two-campus institution with a student body of about 9,000, of whom 3,000 are enrolled in the graduate and professional programs. Established in 1969, the Graduate School of Business Administration joined the Schools of Medicine, Nursing, Law, Engineering, Divinity, and Forestry in preparing qualified individuals for professional leadership and developing excellence in education for the professions.

The Campus. The main campus (West) of Duke University is a beautifully designed complex of buildings in Gothic architecture, bordered on the east by the Sarah P. Duke Gardens and on the west by the 8,000-acre Duke Forest. This campus is dominated by the Duke Chapel, whose 210-foot-high tower houses a 50-bell carillon. The William R. Perkins Library is one of the largest research libraries in the country. The facility for the Fuqua School of Business is located on West Campus near the intersection of Science Drive and Towerview Drive. The East Campus is a smaller complex of Georgian-style buildings and has, as major points of interest, the Duke University Museum of Art and the Mary Duke Biddle Music Building.

Durham is a part of the Research Triangle, an area formed by Duke University, the University of North Carolina at Chapel Hill, and North Carolina State University at Raleigh. The Research Triangle Park, a 5,400-acre campus for research laboratories, governmental agencies, and research-oriented industries, is recognized as one of the world’s leading science centers. Durham, located near the center of the state, has easy access to the Great Smokies of the Appalachian Mountains and to the scenic and historic beaches of the Outer Banks. The area offers varied cultural and recreational activities ranging from concerts, opera, dance, theater, and recitals to intramural and collegiate sports, boating, skiing, camping, and other outdoor activities.

The Fuqua School of Business. Recognizing the importance of business education, Duke University’s Board of Trustees established the Graduate School of Business in 1969,

with the mandate to provide management education programs of the highest quality. The school began with two programs; an undergraduate major in management science, which now no longer exists, and a fledgling M.B.A. Program that graduated its first class of twelve students in 1972. Since that time, the school has grown to include five major academic programs, a faculty of eighty-eight, and over 800 masters degree candidates enrolled in daytime and executive M.B.A. programs. The school also offers a wide range of nondegree executive education programs and seminars.

J. B. Fuqua, chairman, The Fuqua Companies, Atlanta, Georgia, has supported the school generously in its development. In honor of Mr. Fuqua's contribution to the school and personal participation in its growth, the school was renamed the Fuqua School of Business in 1980 by proclamation of the Board of Trustees.

In January of 1983, the Fuqua School of Business moved into its present building on Science Drive on Duke University's West Campus. This building, designed by Edward Larrabee Barnes, offers one of the finest settings for management education in the United States. The 140,000 square feet of space provides for the instruction of M.B.A. students in a variety of degree programs.

The building is constructed in two wings. One wing, primarily designed for M.B.A. education, includes six amphitheater-style classrooms, the 500-seat Harold S. Geneen Auditorium, a library completely devoted to management education, and numerous seminar and breakout rooms.

In May of 1989 the Fuqua School opened the 103,000 square foot R. David Thomas Center. Named after the founder of Wendy's International, Inc., the center has 111 guest rooms, three classrooms, a 250-seat dining room, and a 110-seat clubroom. The center was designed to be a comfortable and efficient facility to serve the Fuqua School's Executive Education and Executive M.B.A. students. The R. David Thomas Center is connected to the main Fuqua School building by a covered walkway.

Resources of the University

The Library System. The libraries of the University consist of the Perkins Library system and three professional school libraries: the Fuqua School of Business Library, the Law Library and the Medical Center Library. The Perkins Library system includes the main library of the university, the William R. Perkins Library, and nine branches: Biology-Forestry, Chemistry, Divinity, the Lilly Library, Engineering, Music, Math-Physics, the Undergraduate Library, and the Pearse Memorial Library at the Duke Marine Laboratory in Beaufort. As of June 1990, Duke libraries contained approximately 4,000,000 volumes and ranked nineteenth in size among academic libraries in the United States. More than 30,000 serials, and 220 newspapers are received regularly. The collection includes more than 9,000,000 manuscripts, 110,000 maps, and 1,280,000 microforms.

The William R. Perkins Library. The William R. Perkins Library—the main library of the university—houses most of the books and journals in the humanities and social sciences, large files of United States federal and state documents, public documents of many European and Latin American countries, publications of European academies and learned societies, and special collections from South Asian, Far Eastern, and Slavic countries. The manuscript collection of approximately nine million items is particularly strong in all phases of life in the South Atlantic region. It also includes significant papers in English and American literature. The rare books collection contains materials covering a broad range of fields, and the Latin and Greek manuscripts constitute one of the outstanding collections in the United States. The collection of Confederate imprints is the largest in the country.

Tours of the Perkins Library are given frequently during orientation week and upon request throughout the year. Handbooks about library services and facilities are also available in each of the libraries.

The Fuqua School of Business Library. The Fuqua library houses the principal business collections for the university, and includes books, journals, reports, working papers, and data bases in accounting, entrepreneurship, finance, human resources management, industry studies, information science, international business, managerial economics, marketing, organizational behavior, and operations management. The library's collections are tailored to the needs of the students and faculty of the Fuqua School and, since the library was established in 1983, most of the materials are recent editions. As of June 1993, the library houses 18,500 volumes of books, 400 current periodical subscriptions, 300,000 microforms, and a comprehensive business reference collection. The library also houses several special collections, including annual and 10k reports on microfiche, computer software, and career services materials. In addition, faculty and students also access more than a dozen databases in the library's database room. These databases include ABI/Inform; Business Periodicals on Disc; CD/Corporate; Compact D/SEC; Datastream; Dun and Bradstreet's Middle Market Directory; Dun and Bradstreet's Million Dollar Directory; General Business File; Lexis-Nexis; Morningstar; Newspaper Abstracts; The Wall Street Journal Full-Text, and Worldscope. These databases contain information on companies, industries, and other topics of interest to business students and faculty.

The library searches all major computerized databases, such as Dow-Jones News/Retrieval and over 200 databases on the Dialog and Lexis-Nexis systems, which cover the spectrum of business research. The library's on-line catalog locates books in all Duke libraries, as well as in the libraries at neighboring universities. In addition, the library has on-line access to other computer systems that locate books and journals in other libraries, and obtains these materials on loan for Fuqua faculty and students.

Library service also include a journal contents alerting service for faculty and library instruction for faculty and students. To assist M.B.A. students, librarians are available Sunday through Friday, including evenings and weekends during the fall and spring terms.

During orientation week, tours are offered covering the library's collections and services. Information about the Fuqua School of Business Library may also be obtained from library staff. In addition, brochures and bibliographies describing the library's collections and services are available at the circulation desk.

Computing Resources. The Fuqua School's Computer Center manages all instructional, research, and administrative computing in the school. For student use, the center maintains two microcomputer laboratories. One contains 42 PCs and the other contains 20 PCs. Additional PCs are located in team study rooms. The majority of PCs are connected to shared laser printers. All PCs in the labs and team rooms are NCR 486 PCs connected by local area networks over which the center distributes a wide variety of software.

The Computer Center maintains an IBM 4381 mainframe computer for faculty research computing, elective M.B.A. coursework, and administrative data processing. A variety of mainframe software systems for communications, database management, statistical analysis, high level language programming are available on the IBM 4381 for large scale business computing.

All PCs in offices and classrooms in the Fuqua building and all student-use PCs are interconnected through a network based on the IBM 4381 and an AT&T ISN. Each of the school's classrooms and auditoria are equipped with a PC capable of projecting both mainframe and PC network applications.

Overall, the Fuqua School's computing facilities provide an impressive wealth of resources to the school. More importantly, the nationally recognized Computer Center fosters a dynamic computing environment characterized by ongoing efforts to expand and improve the computing resources available to students and faculty.

Programs of Study



The Master of Business Administration Programs

The M.B.A. Program at the Fuqua School of Business prepares individuals for challenging management careers. The program emphasizes the understanding and application of analytical tools and concepts drawn from a broad array of management fields of inquiry. Students are asked to structure unstructured situations and to propose solutions to complex problems. By studying analytical tools, theories, and examples, students learn to identify the common threads in seemingly different business situations and to grasp the essential nature of unfamiliar management problems.

The faculty uses a variety of teaching styles. In some courses, lectures are used. In others, the case method predominates. In still others, there is a mix of many styles, including role playing and student presentations. Depending on the course, the work done outside of class is likely to consist of (1) reading texts or articles, (2) working problem sets, (3) researching and writing papers, or (4) preparing cases and discussing them in small study groups.

The school has made a deep commitment to the use of the personal computer in business education. Students are required to master word processing, spread-sheet programs, and some statistical packages on microcomputers. A number of courses require the use of these rapidly developing managerial skills. Likewise, the school is also committed to improving the communication skills of its students. The business communication curriculum does not stand by itself, but has been carefully integrated into other course work.

In academic year 1993-94, the Fuqua School radically altered its curriculum. This was done in response to nearly a decade of serious questioning of American graduate management education. Prior to designing this new curriculum the school spent a year in close consultation with its partners (corporations, alumni, students, and faculty) to determine what a modern graduate program should contain. To date this new curriculum has been a huge success, placing the Fuqua School squarely in a leadership position in graduate management education. The Fuqua curriculum is described in detail in the section below.

The Fuqua School of Business is accredited by the American Assembly of Collegiate Schools of Business and is a member of the Graduate Management Admission Council.

OUTLINE OF THE CURRICULUM

The M.B.A. degree requires four semesters, divided into a total of eight terms, of full-time academic work totaling at least 85 units of graduate course credit. Students who are proficient in a particular subject may be allowed to substitute advanced course work for one or more core courses. There are no summer sessions for students in the M.B.A. program.

Modern management often requires analytical reasoning which focuses on precise statements of relationships between variables. In contemplating the future, concepts of

probability become especially important. For these and other reasons much of the course work assumes a firm grasp of mathematical concepts. Applicants are strongly encouraged to come prepared with the necessary background. A working knowledge of calculus is essential. Evidence of this preparation is required for admission.

Integrative Learning Experiences. Each semester begins with a required Integrative Learning Experience. The Integrative Learning Experiences (ILEs) are designed to address areas of the curriculum that are difficult to present in a traditional classroom setting and are better addressed via nontraditional and multiple formats. The four ILEs are organized to reflect the stages of a student's development as he or she progresses through the program. The first ILE creates a sense of community among the students that is vital to the teamwork required by later course assignments. After students have taken two terms of classes, the second ILE provides a format for examining issues of managing quality and workforce diversity. As students begin the second year, they engage in a strategic management simulation in the third ILE in which they integrate all of the material from their first-year coursework. While students prepare to rejoin the business world, they examine an actual complex management issue in the fourth ILE that has the potential to shape the course of business over the next decade. This ILE requires them to review the strategic issues confronting all functions of the firm. The Integrative Learning Experiences form one of the most exciting and innovative components of the Fuqua School's curriculum.

THE FIRST YEAR

Course work in the first year is designed to provide the basic knowledge and tools of analysis for the operation of business organizations and to introduce the student to the functional areas of the firm. The first-year program includes:

Typical First-Year Schedule

Semester 1

BA 401. ILE: Team Building and Leadership Development

Term 1

- BA 300. Managerial Economics
- BA 311. Statistical Analysis for Management
- BA 320. Managerial Effectiveness
- BA 380. Individual Effectiveness
- BA 381. Individual Effectiveness

Term 2

- BA 301. Economic Environment of the Firm
- BA 312. Decision Models
- BA 330. Financial Accounting
- BA 382. Individual Effectiveness

Semester 2

BA 402. ILE: Managing Quality and Diversity

Term 3

- BA 350. Financial Management
- BA 360. Marketing Management
- BA 370. Operations Management
- BA 383. Individual Effectiveness

Term 4

- BA 331. Managerial Accounting
- Elective
- Elective
- BA 384. Individual Effectiveness

THE SECOND YEAR

During the second year of the program, students may choose from a wide variety of electives. The school does not require formal concentrations, so students are free to choose electives either focusing on a particular functional area or develop a program that emphasizes breadth of general management skills. The program's flexibility allows students to tailor the curriculum to meet their individual educational and career goals.

There is one required course during the second year. The course, *The International Environment*, provides Fuqua students with the perspective to work effectively in today's global business environment.

Students may take either nine or ten electives during the second year. The typical course load in the second year is three courses per term; however, students may elect to take one less elective during one term of the second year to accommodate the heavy recruiting schedules which are part of the job search. Combining these second-year electives with the two electives taken in the first year, the program offers a total of eleven or twelve elective courses.

Also attractive to second-year students is the opportunity to take up to four courses in other schools or departments at Duke University, such as the School of Law, the School of the Environment, the Institute of Policy Sciences and Public Affairs, and the Department of Economics of the Graduate School. With approval, two of the four outside courses may be at the undergraduate level, for example, an undergraduate foreign language course.

Typical Second-Year Schedule

Semester 3

BA 403. ILE: Competitive Business Strategy

Term 5

BA 341. *The International Environment*

Elective

Elective

Term 6

Elective

Elective

Elective

Semester 4

BA 404. ILE: Complex Management Problems

Term 7

Elective

Elective

(Elective)

Term 8

Elective

Elective

Elective

M.B.A. with an Accounting Concentration

Thanks to extensive financial support from the major public accounting firms, the Fuqua School of Business offers an M.B.A. degree with a concentration in accounting. Although Fuqua School students are not required to designate a major as part of the completion of the M.B.A. degree, those interested in professional careers in accounting may choose to concentrate in this area. Students who elect to pursue the concentration in accounting usually do so with the intent of entering the accounting profession and

taking the CPA exam immediately after the completion of their degree. Certified Public Accountants are licensed by individual states, all of which use the Uniform CPA Examination. This entry level examination necessitates that students take a specified curriculum in order to be adequately prepared. Additional course requirements may be imposed by specified states for licensing in addition to those courses in the accounting concentration. Students enrolling in the program should determine the particular licensing requirements of the individual states in which they are interested in residing.

M.B.A. with a Health Services Management Concentration

The Health Services Management concentration provides students with the opportunity to develop particular skills and knowledge about the management of health organizations, including hospitals. M.B.A. students who intend to enter or have a strong interest in health care management are invited to pursue the M.B.A. with a health services management concentration.

In the first year, the M.B.A./H.S.M. student takes the M.B.A. core curriculum. In addition, a seminar on health services management is given. The seminar involves discussions with numerous health care managers and examines current health care issues. Between the first and second years, the M.B.A./H.S.M. students do an internship in a health services organization. In the second year, the M.B.A./H.S.M. students are required to take courses in health care policy, managing the professional service organization, and the strategic management for health sciences. In addition, two of the



following electives are required: Human Resource Management, Operations Management in the Service Sector, Marketing of Services, Quality Control, or Accounting for Service Organizations. M.B.A./H.S.M. students have the opportunity to take numerous nonspecified electives as well. Also, M.B.A./H.S.M. students take a second-year health services management seminar.

The M.B.A./H.S.M. graduate is especially prepared to pursue a managerial career in health management in hospitals, health care organizations, and a number of health care related industries. To obtain the H.S.M. concentration designation, students must complete all course requirements outlined above and successfully complete two of the following: first-year health care management seminar, the summer internship, and one second-year health care management seminar. The concentration is accredited by the Accrediting Commission on Education for Health Services Administration.

The Doctor of Philosophy Program

The Ph.D. in Business Administration Program prepares candidates for research and teaching careers at leading educational institutions and for careers in business and governmental organizations where advanced research and analytical capabilities are required. The Ph.D. program places major emphasis on independent inquiry, on the development of competence in research methodology, and on the communication of research results. Students are introduced at the outset of the program not only to rigorous course work, but also to the research activities of the faculty and of other students. (A ratio of doctoral students-in-residence to faculty of less than one to one facilitates this opportunity to work closely with faculty.)

The program requires that doctoral candidates must acquire expertise in their chosen area of study and in research methodology. This competence may be gained from course work, participation in seminars, and independent study. Each student takes a comprehensive exam at the end of the second year or the beginning of the third year of residence. The final requirement is the presentation of a dissertation. The Ph.D. program usually requires four to five years of work. The student and his/her faculty committee determine the specific program of study.

Special Programs

CONCURRENT DEGREE PROGRAMS

The Fuqua School of Business offers combined degree programs with the School of Law, the School of the Environment, the Institute of Policy Sciences and Public Affairs, and the School of Engineering, all at Duke University. By recognizing certain areas of study common to the M.B.A. and each of the other advanced degrees, duplication of instruction is eliminated and students are able to obtain the concurrent degrees in less time than would normally be required to obtain the two degrees separately. Students are normally required to take 51 units of business administration course work following admission to a concurrent degree program.

The M.B.A.-J.D. The concurrent M.B.A.-J.D. program requires four academic years of study with a full year in each school and two years of combined study that meets the requirements for both the M.B.A. and J.D. degrees. Students must apply for admission and be accepted by both the School of Law and the Fuqua School of Business. Additional information on the program may be obtained from the Director of Admissions, the Fuqua School of Business, Duke University, and the Admissions Office, Duke University School of Law.

The M.B.A.-M.F. and the M.B.A.-M.E.M. The concurrent M.B.A. and Master of Forestry or Master of Environmental Management degrees normally require three years of study. Students must apply for admission and be accepted by both the School of the Environment and the Fuqua School of Business. Additional information on the program

may be obtained from the director of admissions, the Fuqua School of Business, Duke University, and the Director of Admissions, Duke University School of the Environment.

The M.B.A.-A.M. in Public Policy Sciences. The concurrent M.B.A. degree and Master of Arts degree in Public Policy Sciences normally requires two and a half to three years of study. The joint degree curriculum requires a minimum of thirty credits to be specified by the Institute of Policy Sciences and Public Affairs, and sixty-seven credits to be specified by the Fuqua School of Business. Students must apply to and be accepted by both the Fuqua School of Business of Duke University and the Graduate School of Duke University. Additional information may be obtained from the director of admissions, the Fuqua School of Business, Duke University, and the director of graduate studies, Institute of Policy Sciences and Public Affairs.

Public Policy Option. For those students interested in management careers in the public or not-for-profit sectors the Fuqua School of Business offers a public policy option. This option consists of a recommended set of M.B.A. elective courses to be taken in the Institute of Policy Sciences and Public Affairs. Students interested in pursuing this option must obtain the consent of the institute's faculty adviser of M.B.A. students and the consent of the M.B.A. program director.

The M.B.A.-M.S. in Engineering. The objective of the M.B.A.-M.S. in Engineering is to enable qualified students to acquire the expertise needed to assume leadership roles in the development and management of the complex technological and societal systems of the future. The program takes five semesters and, in most cases, an undergraduate degree in engineering is needed. Additional information about the Duke University School of Engineering and this program may be obtained by writing the Director, M.B.A.-M.S. Program, School of Engineering, Duke University, Durham, North Carolina 27706.

COMBINED UNDERGRADUATE-PROFESSIONAL DEGREES

Also known as the "three-two" program, the combined undergraduate-professional degree program provides that the Bachelor of Science or Bachelor of Arts degree may be awarded to students who successfully complete three years in an approved curriculum in arts and sciences or engineering at Duke and also the first year of study for the Master of Business Administration. After two years at Duke and before transfer to the Fuqua School of Business, students may apply for the three-two program through their academic dean. To be eligible for the combined program a student must successfully complete all baccalaureate requirements (except eight elective courses) and be admitted to the business school. Upon satisfactory completion of the first two semesters in the Fuqua School of Business, the student will be awarded a baccalaureate degree. The M.B.A. degree is awarded upon completion of the second year of the program.

EVENING EXECUTIVE M.B.A. PROGRAM

The Fuqua School of Business offers an M.B.A. degree for practicing managers in the greater Durham-Raleigh area. The program is designed for those who are seeking a broad educational base as preparation for more senior managerial positions, while continuing full-time job responsibilities. Major objectives of the program are to improve decision-making and management skills, and the effective utilization of these skills in resolving contemporary management problems.

The Evening Executive M.B.A. Program requires twenty-five months of study and includes six semesters of course work. A minimum of three years of postbaccalaureate work experience is required in order to be eligible to apply. Students interested in the program should contact the Director of the Evening Executive M.B.A. Program or the Director of Admissions, Fuqua School of Business, Duke University.

WEEKEND EXECUTIVE M.B.A. PROGRAM

The Fuqua School of Business also offers a Weekend Executive M.B.A. Program. The program is tailored to fit the schedule of the fully employed business executive who wishes to complete an M.B.A. degree without career interruption. It offers mature executives a broad perspective on general management responsibilities and includes the tools, concepts, and strategies required for senior leadership.

The Weekend Executive M.B.A. Program begins with an orientation program, and then meets Friday-Saturday every other weekend. The program requires twenty months of study and includes five semesters of course work. Students interested in the program should contact the Director of the Weekend Executive M.B.A. Program or the Director of Admissions, Fuqua School of Business, Duke University.

EXECUTIVE EDUCATION

In addition to traditional M.B.A. degree programs, the Fuqua School offers an extensive array of nondegree executive education programs based on the recognition that education is a life-long process requiring continual renewal. Since the first full year of operation, the number of participants enrolled in executive courses has increased over four-fold. Now serving approximately 2,000 executives a year, the 15 open enrollment and over 45 tailored, company-specific programs allow for business leaders from all over the world to benefit from the quality of education that the Fuqua School offers. The interaction of faculty, administrators, and participants gives executives the opportunity to learn from the best in both academic and corporate sectors, and keeps the Fuqua School, and its graduate students, in touch with the present day concerns of business leaders.

Perhaps the strongest symbol of the Fuqua School's commitment to executive education is the R. David Thomas Center. This 103,000 square-foot facility features three state-of-the-art classrooms, two conference rooms, fifteen teamrooms, six study lounges, full dining facilities, fitness center, and one hundred and eleven sleeping rooms. Designed specifically for the needs of executives, this facility is among the finest in the country and helps to strengthen the quality of the Fuqua School's program efforts.

Among the major programs offered in executive education are the four-week Advanced Management Program, now offered three times a year, and the two-week Program for Manager Development, offered four times yearly. In addition to these general management courses, the school also has programs in functional areas such as Strategic Marketing (one week), Finance for Nonfinancial Managers (one week), Negotiations in a Professional Environment (one week), as well as programs developed for specific industries such as the Executive Program for Corporate Counsel and Competitive Strategies and Financial Management Programs for the Telecommunications Industry. Additionally, the Executive Education staff works with individual firms to develop and deliver programs tailored to meet specific needs. Companies such as AT&T, Bethlehem Steel, Eli Lilly, Ford, Harnischfeger Industries, GTE, ITT, Johnson & Johnson, Lafarge Corporation, Pacific Telesis, Price Waterhouse, and Northern Telecom have taken advantage of Fuqua's expertise to address a wide area of corporate issues.

Further information may be obtained by contacting Dr. Blair H. Sheppard, Associate Dean and Director of Executive Education, the R. David Thomas Center, Fuqua School of Business, Duke University, Durham, NC 27708, telephone number (919) 660-6345.

Admissions



Admissions

Anyone who holds a bachelor's degree from an accredited college or university, but does not already hold an M.B.A. degree, is eligible to apply for admission to the Fuqua School of Business. No specific undergraduate major is deemed preferable to any other; however, the programs are designed primarily for persons with training in the liberal arts, engineering, or the sciences. The Admissions Committee seeks those candidates with leadership potential who are prepared to compete successfully in a demanding course of study which requires logical and analytical reasoning. All entering students are expected to have a working knowledge of calculus, and applications are reviewed closely for this ability. Matriculants to the M.B.A. Program are expected to sign and abide by the Honor Code agreed upon by the students and faculty of the Fuqua School of Business.

The Admissions Committee considers full-time business or military experience to be a definite asset in the admissions process. Consequently, 97 percent of the most recent M.B.A. class entered Fuqua with full-time work experience.

Application Information. Complete instructions for filing an application are included with each application packet. Each applicant must submit the following to the Admissions Office before action can be taken:

1. **Application Form:** Careful completion of the application will ensure a thorough evaluation. Since it is desirable that the application be as complete as possible, additional sheets should be used if necessary.
2. **College Transcripts:** An official transcript from each of the colleges *attended* must be sent to the Admissions Office. Students who apply during their senior year must ensure that a final transcript be received by the business school prior to enrolling.
3. **Letters of Recommendation:** Three letters of recommendation are required and must be sent to the Admissions Office. Recent graduates or those in their senior year should have at least one letter submitted from persons familiar with their academic ability. Recommendations should be professional or academic, not personal.



4. Graduate Management Admission Test: Score reports must be sent directly from the Educational Testing Service to the Fuqua School of Business.
5. Application Fee: A nonrefundable fee of \$65 to cover processing must be submitted with the application.

Any questions or requests for application materials should be addressed to the Director of Admissions, The Fuqua School of Business, Duke University, Box 90104, Durham, North Carolina 27708-0104, telephone (919) 660-7705.

The Fuqua School uses a rolling decision process and applicants are encouraged to complete their applications as early as possible. In general, the processing and review time for completed applications is six to eight weeks. Those received after the final April 1 deadline will be considered on a space-available basis. Applications will be reviewed and candidates notified according to the following schedule:

Completed application received:	Decision mailed by:
December 1, 1993	January 31, 1994
January 14, 1994	March 14, 1994
February 14, 1994	April 14, 1994
April 1, 1994	May 31, 1994

Notification of Status. When the applicant has been accepted, a letter of admission and an acceptance form will be sent. A nonrefundable tuition deposit of \$500 will be required to reserve a place in the class. The process of admission is not complete until the statement of acceptance and the tuition deposit have been returned to the Director of Admissions.

Applicants notified of acceptance prior to March 15 will be expected to make the \$500 tuition deposit by April 15. Applicants notified of acceptance after that date will be expected to make the tuition deposit within three weeks of the notification, or the place

in the entering class will be forfeited. It should be reiterated that the tuition deposit is in all cases nonrefundable.

Graduate Management Admission Test. The Graduate Management Admission Test, required of all applicants, is administered by the Educational Testing Service. Detailed information about the test and application forms may be obtained by writing directly to the Graduate Management Admission Test, Educational Testing Service, Box 6103, Princeton, New Jersey 08541-6103.

The examination is administered at many centers throughout the United States and abroad. Arrangements to take the test at an established center must be made four weeks before the test date (six weeks prior to test date at established foreign centers). The examination is given four times a year. Special centers may be arranged for persons distant from established centers. Requests for such accommodations must be made at least eight weeks prior to the selected test date. Applicants are encouraged to take the test in October or January; those taking the test in March or June run the risk of having the class already filled by the time scores are available.

Admission of International Students. Fully qualified students from outside the United States are welcome at the Fuqua School of Business. In applying for admission, the foreign student should submit, in addition to the above credentials, the following:

1. If the native language is not English, the results of the Test of English as a Foreign Language (TOEFL) must be submitted. Most successful applicants score approximately 600 or better on the TOEFL.
2. A statement certified by a responsible person that finances are sufficient to maintain the student during the stay at Duke University. The university does not at the present have fellowship or loan programs for international students.

The M.B.A. program is a two-year program and all students are expected to complete the required course work in the allotted time period. International applicants should be prepared to carry the normal course load as described earlier in the bulletin. For this reason, applicants whose native language is not English should consider the merits of enrolling in the Summer Institute in American Business, Communication, and Culture offered by the Fuqua School. Since the course work in the program involves lectures, discussions, and group projects, a firm understanding of the language is required.

Financial Information



Tuition and Fees

The tuition for students in the Fuqua School for the year 1993-94 is \$9,900 per semester. All charges are due and payable at the times specified by the university and are subject to change without notice. A late registration fee of \$50 is charged any student not completing registration during the registration periods. An \$8 charge will be imposed for any student's check returned to the university unpaid.

After the beginning of classes, refunds will be made on a pro rata basis. Students may elect to have tuition charges refunded or carried forward as a credit for later study according to the following schedule:

1. Withdrawal before classes begin: full refund.
2. Withdrawal during the first or second week of classes: 80 percent.
3. Withdrawal during the third, fourth, or fifth week of classes: 60 percent.
4. Withdrawal during the sixth week: 20 percent.
5. Withdrawal after the sixth week: No refunds.

Tuition or other charges paid from grants or loans will be restored to those funds not refunded or carried forward.

If for any reason during the program, a student should find it necessary to request a reduction in the normal course load, this request will be reviewed by the program director. If the program director approves a reduction in the course load, the student has the right to request a corresponding reduction in tuition charges. These requests will be considered only for those students for whom the course reduction will necessitate enrollment in the Fuqua School in excess of four semesters for M.B.A. students or six semesters for Executive M.B.A. students. Students receiving approval for a tuition reduction will be charged on a pro rata basis.

Payment of Accounts. Following first enrollment in the Fuqua School, monthly invoices are sent each student by the bursar's office. As a part of the agreement of admission to Duke University a student is required to pay all invoices as presented. A late payment charge will be assessed for all charges not paid in full by the due date, and certain restrictions may be applied. All students are charged the student health fee and

student accident and sickness insurance coverage unless they file properly completed and signed waivers in the bursar's office by the invoice due date.

Late Payment Charge. If the total amount due on the student's invoice is not received by the bursar by the invoice due date, a penalty charge will be accrued from the billing date of the invoice. The late payment charge is assessed at a rate of the 1/3 percent per month (16 percent per annum) applied to the past due balance. The past due balance is defined as the previous balance less any payments and credits related to the previous balance which appear on the invoice.

Restrictions. An individual will be in default if the total amount due is not paid in full by the due date. A student in default will not be allowed to receive a transcript of academic records, have academic credits certified, or receive a diploma at graduation. In addition, an individual in default may be subject to withdrawal from school.

M.B.A. Association Student Activity Fee. All students are assessed a \$100 nonrefundable fee to be used to support the activities of the M.B.A. Association.

Athletic Tickets. Athletic ticket books are available to graduate students. Purchase is optional, with payment due in the fall semester.

Vehicle Fee. Each student possessing or maintaining a motor vehicle at Duke University shall register it at the beginning of the academic year in the Duke Public Safety Office at 2010 Campus Drive. A student who acquires a motor vehicle and maintains it at Duke University after academic registration must register it within five calendar days after operation on the campus begins. Resident students are required to pay an annual fee for each motor vehicle.

At the time of registration of a motor vehicle the following documents must be presented: state vehicle registration certificate, valid driver's license, and a student identification card.

Student Health Fee. All students are assessed a nonrefundable fee for the Student Health Service. The fee for 1993-94 is \$365 (\$182.50 per semester).

Student Accident and Sickness Insurance. The university has made arrangements for a Student Accident and Sickness Insurance Plan to cover all full-time students for a twelve-month period. For an additional fee a student may obtain coverage for a spouse and children. Although participation in this program is voluntary, the university requires all graduate students to be financially responsible for medical expenses above those covered by the University Student Health Program through the University Accident and Sickness Policy, a private policy, or personal financial resources. Students who have equivalent medical insurance or wish to accept the financial responsibility for any medical expense may elect not to take the Duke plan by signing a statement to this effect. *Each full-time student in residence must purchase this student health insurance or indicate the alternative arrangement.* The Student Accident and Sickness Insurance Policy provides protection twenty-four hours per day during the full twelve-month term of the policy for each student insured. Students are covered on and off campus, at home, while traveling between home and school, and during interim vacation periods. The term of the policy is from the opening day of school in the fall. Coverage, services, and costs are subject to change each year as deemed necessary by the university. The rates for 1993-94 are estimated at: student only—\$650 per year; and family plan (student, spouse, and children)—\$2,060 per year.

Living Expenses. The estimated student living costs for the 1993-94 academic year are approximately \$9,000 for ten months. These estimates include allowance for room and board, transportation, and miscellaneous personal expenses.

Debts. No records are released until students have settled with the bursar for all indebtedness. Failure to pay all university charges on or before the times specified by the university will bar the student from class attendance until the account is settled in full.

Students are expected to meet academic requirements and financial obligations, as specified elsewhere in this bulletin, in order to remain in good standing. Certain nonacademic rules and regulations must be observed also. Failure to meet these requirements may result in dismissal by the appropriate officer of the university.

Financial Aid

The Fuqua School of Business endeavors to make it possible for qualified students to attend Duke even though their own resources may be insufficient. Financial aid is available in the form of fellowships and through various loan programs.

SCHOLARSHIPS AND FELLOWSHIPS

Each year a number of merit-based fellowships are available to incoming students. The criteria for selection are prior academic achievement, demonstrated qualities of leadership, involvement in extracurricular activities and professional accomplishments. The awards are for two years of graduate study, ranging from partial tuition to full tuition. Requests for fellowships should be filed early in order to receive full consideration. Funding is limited and is awarded on a rolling basis as applicants are admitted to



the program. Students who enroll without a fellowship or scholarship award should not anticipate an award in their second year.

NAMED SCHOLARSHIPS AND FELLOWSHIPS

First-Year Awards

Listed below are the named awards for first-year students who have already been awarded a Fuqua fellowship. Selection of recipients is made during the summer and no special application is required. The awards replace, but would not be less than, funds that have already been offered and do not provide additional scholarship aid to the recipient.

A. F. Calabrese Scholarships. John J. Mack, A.B. 1968, and a member of the school's Board of Visitors, established this endowed fund to honor A. F. Calabrese. The fund provides scholarships for students enrolled in the Fuqua School who participated in intercollegiate athletics. Preference is given to students who attended Duke or the Catholic University of America.

Allied-Signal Fellowships. These fellowships were established by Allied-Signal Foundation Inc. in order to provide support for outstanding students at the Fuqua School. The fellowships may be awarded to either first- or second-year students.

CIGNA Fellowship. Established by the CIGNA Corporation, this fellowship is awarded biennially to a qualified minority student. The fellowship is a two-year commitment of \$2,500 per year for the student chosen.

Citicorp Scholarship. Established by Citicorp, one scholarship is awarded biennially to an outstanding student. The scholarship provides a two-year commitment of \$10,000 each year.

First Chicago Minority Scholarship. This \$5,000 scholarship is provided by First Chicago to an outstanding minority student. The recipient of this scholarship may be a first- or second-year student.

Robert A. and Annie Lewis Garda Scholarship. Robert A. Garda, B.S.E.E. 1961, chairman of the Fuqua School's Board of Visitors, and his wife Annie Lewis Garda, A.B. 1961, endowed this scholarship to provide major support to one outstanding student during his or her studies at the Fuqua School.

P. Huber Hanes Scholarships. Established in 1939, through the donation of P. Huber Hanes, these scholarships are given annually to Duke students admitted by the Fuqua School into the combined undergraduate-professional degree program.

Junior Achievement Scholarship. A grant from the Little Family Foundation annually supports two awards of \$5,000 each. These scholarships are given to students who have participated actively in a Junior Achievement Company and/or who have worked as an advisor to a Junior Achievement Company. Recipients also must have work experience.

Sara Lee Fellowships. These fellowships provide full-tuition support to three recipients each year. These fellowships are funded by the Sara Lee Foundation which has particular interest in students with operations and marketing backgrounds.

The J. Paul Sticht Endowed Scholarship. Funded by RJR Nabisco Inc., these fellowships were endowed by the R. J. Reynolds Industries in honor of former Reynolds chairman J. Paul Sticht. The fellowship is awarded annually to a graduate of Mr. Sticht's alma mater, Grove City College.

Unilever U.S. Scholarship. Funded by Unilever U.S., this scholarship for \$7,500 per year is a two-year commitment for the student selected. Students with marketing backgrounds are considered.

Philip Morris Scholarship. Philip Morris USA established this scholarship to provide tuition support to a minority student with career interest in plant operations.

Cyclone Scholarship. This scholarship was established to provide support to Iowa State University graduates who attend the Fuqua School. The award is based on his/her academic performance while attending Iowa State University.

Bristol-Myers Squibb Scholarship. This scholarship was established by the Bristol-Myers Squibb Foundation to support a minority student at the Fuqua School who has expressed an interest in a finance career.

Health Services Management Scholarships. The following scholarships are for Fuqua students in the health services management concentration: Ray Brown Scholarship; Marshall I. and Sarah W. Pickens Scholarship; ServiceMaster Scholarship; Thomas Frist Scholarship; Alumni Scholarship; and the Alumni Need Scholarship. Selection of recipients is made by the Fuqua School financial aid committee and no special application is required.

Ryder System Minority Scholarship. Provided by Ryder System Inc., this \$5,000 scholarship is awarded to outstanding minority students. The recipient may be either a first- or second-year student.

Second-Year Named Awards

Listed below are the named awards reserved for second-year students who are already receiving Fuqua fellowships/scholarships and have distinguished themselves with high academic achievement and community involvement during their first year of study. Selection of recipients is made during the summer and no special application is required. With the exception of the Class of 1987 and 1988 scholarships, these named awards replace, but would not be less than, the Fuqua fellowship received and do not provide additional scholarship support to the recipient.

Accounting Associates Fellowships. These fellowships were established through the donation of the Accounting Associates, a partnership of Duke University accounting professors. These awards are given annually to M.B.A. students pursuing an interest in accounting.

David S. and Susan Bagwell Endowment. David S. Bagwell, Class of 1973, established this endowment to provide support for a Fuqua student with high academic achievement.

Martin L. Black Fellowships. These fellowships were established by the gifts and donations of alumni and friends of the late Martin L. Black, professor emeritus, and a faculty member in accounting at Duke for over forty years. The awards are given to students planning to concentrate in accounting.

Leo Burnett Scholarship. Awarded to a student showing exceptional talent and ability in marketing and/or advertising, this scholarship also is awarded on the basis of financial need.

Carolinas Cash Management Association Scholarship. This scholarship is awarded annually to a student from North or South Carolina or Virginia who has excelled academically and is oriented towards a career in finance. The gift is made possible through an endowment from the Carolinas Cash Management Association.

The Chase Manhattan Scholarship. Endowed by the Chase Manhattan Bank, this fund provides support to Fuqua students who have proven records of excellence.

Class of 1987 Scholarship. This scholarship was established by the Class of 1987 to provide support for a second-year student who did not receive scholarship aid in the first year; who is active in school and/or extracurricular activities and has achieved high academic standing.

Class of 1988 Scholarship. This scholarship was established by the Class of 1988 to provide support for a second-year student who did not receive scholarship aid in the first year; who is active in school and/or extracurricular activities and has achieved high academic standing.

Class of 1990s Non-Profit and Small Business Internship Award. This award was established as a class gift by the Class of 1990 to provide support for students who choose summer internships with nonprofit/public organizations or small- to medium-sized businesses. The award is selected by an advisory board and is prioritized by non-profit, public organizations, and small- to medium-sized businesses.

The Julian Connally Scholarship Fund. This fund was established by Julian U. Connally, Class of 1930, to provide support for students enrolled in the Fuqua School of Business.

Walter Albert and Bertha Barefoot Corbett Memorial Scholarship. W. Horace Corbett, Class of 1938, and his wife, Valera Murray Corbett, established this scholarship in honor of Mr. Corbett's parents.

The Martin F. C. Emmett/Tambrands Endowment Fund. This scholarship fund was established by the Tambrands Inc. and Martin F. C. Emmett to provide financial assistance to Fuqua students who have achieved high academic standing.

James R. Felts Memorial Scholarship. This scholarship was established by family, friends, and colleagues in memory of Mr. Felts, who was an honorary alumnus of the Health Administration Program. It provides support to Fuqua students in the health services management concentration.

Charles H. Frenzel Scholarship. Named for a former faculty member in the Health Administration Program, this scholarship was funded by the McLeod Regional Medical Center where Dr. Frenzel ended his career. This scholarship provides support for a student concentrating in health services management.

Friends of Fuqua Scholarship. This scholarship was established by an anonymous donor to provide support to Fuqua students based on academic standing.

James G. Hanes Memorial Scholarship Fund. This scholarship was established by the James G. Hanes Memorial Fund/Foundation to provide support for Fuqua students with high academic achievement.

Amerada Hess Corporation Fellowship. This award provides support to one student in each class. Students with work experience in manufacturing, energy, or accounting with undergraduate degrees in engineering, earth sciences, or accounting/finance will be considered for this award by the Fuqua School Financial Aid Committee.

Vivian Edward Hollinshed Scholarship. This scholarship was endowed by Clara K. Hollinshed in honor of her husband. Preference is given to students who have resided in the southeastern region of the United States for at least five years.

Edward A. Horrigan, Jr. Business Scholarship. Edward A. Horrigan, Jr., a former member of Fuqua's Board of Visitors, endowed this fund to provide scholarship support for an American-born U.S. citizen who is largely dependent upon financial aid for the cost of his or her education.

Richard and Mamie Howerton Scholarship. This scholarship was established by Thomas R. Howerton, Duke class of '43 and M.H.A. '48, to honor his parents, Richard and Mamie Howerton. It provides support to Fuqua students in the health services management concentration.

Thomas Crafton Keller Memorial Fund. This was established by Thomas F. Keller in memory of his son, Thomas Crafton Keller, and supports Fuqua students with high academic achievement.

William A. and Anne L. Klopman Scholarships. This endowment fund was established by a donation from William A. and Anne L. Klopman, parents of three Fuqua graduates. Mr. Klopman is retired chairman of Burlington Industries.

Mead Scholarships. Established by the donation of D. Richard Mead, Jr., A.B. 1952, these scholarships are given to students who, without such support, might otherwise not be able to afford graduate study.

James H. Moshivitis Endowment Fund. This scholarship was established by James H. Moshivitis to provide financial support to Fuqua students who have achieved high academic standing.

The Robert Price Scholarship. This scholarship, endowed by Robert Price, a Duke graduate and member of Fuqua's Board of Visitors, recognizes academic achievement.

Howard C. Ris Scholarships. This scholarship is awarded to a Fuqua student who has demonstrated outstanding ability and potential. This endowed scholarship is made possible by a gift from Howard C. Ris, A.B. 1938, retired chairman of Ris Paper Company, Inc.

John W. Rollins Scholarship. This scholarship/loan award is given annually to five second-year students. Rollins Scholars possess outstanding leadership qualities and strong records of academic achievement. This award was established by John W. Rollins, Sr., chairman and chief executive officer of RLC Corporation.

The Ann Williams Vander Weide Endowment Fund. This endowed fund was established by James Vander Weide, research professor at the Fuqua School, in honor of his late wife. This scholarship provides support to Fuqua students who have demonstrated high academic achievement

Herman and Johanna Vander Weide Scholarships. This endowed fund was established by James H. Vander Weide, research professor at the Fuqua School of Business, in honor of his parents.

Financial Aid Application Process. Financial aid award decisions for entering students are made after admissions to the program is offered, with the first awards being made in January for the class beginning in August of that year. All students applying for financial assistance (scholarships, fellowships, loans, or work) must complete the financial aid application form.

STUDENT LOAN PROGRAMS

The Fuqua School participates in long-term student loan programs and the Federal College Work-Study Program. These programs are available to students who demonstrate need according to federal guidelines.

Federal Stafford Student Loan Program.

(A) Subsidized Loan Program: (Need-Based). This federally subsidized low interest loan enables graduate students who qualify on the basis of need to borrow up to \$7,500 (\$8,500 after 10/01/93) per academic year, with aggregate limit (undergraduate and graduate combined) of \$65,000 per student. These funds may be borrowed from local banks, credit unions, savings and loans, and other participating lenders. For loans made to new borrowers after 10/01/92, the interest rate is an annual variable rate (not to exceed 9 percent) based on 91-Day T-Bills plus 3.10 percent and set annually in July. The effective rate through 06/30/93 is 6.94 percent. For prior borrowers (currently have loan balance outstanding) loans are at the same rate as previous loans, which may be at 7 percent, 8 percent, or 9 percent and the 8/10 percent rate for borrowers after 06/30/88. Repayment begins six months after graduation or termination of enrollment. The loans are disbursed in one-half each semester, and a 5 percent loan origination fee is deducted from each disbursement of the loan. The minimum payment per month during repayment is \$50, and the maximum repayment period is ten (10) years.

(B) Unsubsidized Loan Program: (Non Need-Based). The unsubsidized Federal Stafford Student Loan has the same terms and conditions as the subsidized program, but the student is responsible for interest that accrues while he/she is in school. A student may receive both subsidized and unsubsidized Federal Stafford Loans not to exceed the applicable Stafford loan limit. This program is available to all borrowers who are not eligible for a subsidized Federal Stafford Loan or are only eligible for a partial Stafford Student Loan. A 6.5 percent combined loan origination fee and insurance premium will be deducted from each disbursement of the loan.

A new FAFSA form and loan application must be completed each academic year when applying for these loans.

Federal Perkins Student Loan Program: (Need-Based).

This campus-based federal student loan program is administered by the institution with no interest charged while you are enrolled full-time. The annual loan limit provides for loans up to \$5,000 per academic year with aggregate limit (undergraduate and graduate combined) of \$30,000 per student. The interest rate is 5 percent and begins to accrue nine months after graduation or termination of enrollment. Limited funding is

allocated to the Fuqua School for this program, and the amount awarded to individual students by the Fuqua School will depend on individual financial need and available funding. A separate application is not required to be considered for the Perkins loan, and no origination or insurance fees are charged. A promissory note and disclosure form for this loan will be completed after you arrive on campus. Perkins loan awards are contingent on adequate federal funding being received. Should funding not be adequate, the Fuqua School will attempt to replace awards with alternate sources.

Federal Supplemental Loan for Students (SLS) (Non Need-Based).

This federally approved loan program is for graduate and professional students. The maximum annual loan amount is \$10,000 per academic year (as of 07/01/93), with an aggregate limit (undergraduate and graduate combined) of \$73,000 per student. The loans are available through local banks, credit unions, savings and loan associations, and other participating lenders. The loans are disbursed one-half each semester. The interest rate is a variable rate (not to exceed 11 percent) based on 52-week T-Bills plus 3.10 percent set annually in July. The rate effective through 06/30/93 is 7.36 percent. A 5 percent loan origination fee will be deducted from each disbursement. Borrowers under this program may defer principal repayment while enrolled full-time. Interest begins to accrue immediately with loan disbursement, but the handling of interest payments or deferment of interest varies according to lender policy. The length of the repayment period and the minimum monthly payment depends on the total borrowed. The repayment period normally does not exceed ten years. Students eligible for a Federal Stafford Loan **MUST** have applied for the Stafford Loan before being eligible to apply for or receive an SLS.

A new FAFSA form and loan application must be completed each academic year when applying for this loan.

Other loans not determined by federal guidelines for those who wish to supplement or replace personal resources.

GradSHARE.

These educational loans through the Nellie Mae Education Loan Program offers graduate and professional students a signature loan based on projected future earnings, rather than on current income and credit worthiness. Annual loan amounts range from \$2,000 to \$7,500 when a student borrows on his/her own, or up to \$15,000 annually with a coborrower. Borrowers can choose between two interest rate options (a monthly variable rate, not to exceed the prime rate plus 2 percent, or a one-year renewable rate, not to exceed the prime rate plus 3 to 4 percent), and have three repayment options: (1) deferred principal and interest payments while enrolled; (2) deferred principal payments while enrolled; (3) fixed monthly payments of principal and interest. Repayment periods range from four to twenty years, depending on the amount borrowed. There is a 6 percent guarantee fee. Your cumulative loan debt for all loans may not exceed \$60,000. For more information contact Nellie Mae, 50 Braintree Hill Park, Braintree, MA 02184 (1-800-634-9308).

MBA Loans Tuition Loan Program (TLP).

This is a private loan made available to business school students by the HEMAR Insurance Corporation of America and Norwest Bank South Dakota N.A. Maximum loan limit is \$15,000 per year with a minimum of twelve years to repay. In school interest is variable, adjusted quarterly and is currently the average 91-day treasury bill, plus 3.5 percent. At repayment (six months after graduation), two interest options are available. Variable, adjusted quarterly not to exceed 91-day T-bills, plus 3.5 percent or fixed rate not to exceed ten-year T-Bonds, plus 4.5 percent. In school interest may be deferred until six months after graduation. Deferred interest is capitalized and added to principle once at repayment. There is an insurance premium which is deducted from loan checks. This premium is 7.5 percent at disbursement and an additional amount added at repayment for loans which are not cosigned. This additional amount is currently set at 3.25 percent.

Your cumulative loan debt for all loans may not exceed \$70,000. For more information contact MBA Loans Processing Center, P.O. Box 64722, St. Paul, MN 55164 (1-800-366-6227).

Student Work Program

College Work-Study Program. The College Work-Study Program is federally funded and supports the employment of students while they are in school. Students must meet federal need eligibility standards to qualify for participation and students work an average of six to eight hours per week. With work-study, a student's salary is paid jointly by the federal government and the Fuqua School. Funding from this program is available for students only when employed by the Fuqua School. Students given work-study allocations are responsible for securing their own employment within the school, which offers a variety of employment opportunities for interested students. A job board is available in the M.B.A. program office area to assist in locations employment.

Career Services



Career Services

The Career Services Office recognizes that students enter the Fuqua School of Business with diverse career interests and various levels of job search and career planning skills. Therefore, services are designed to meet a wide range of interests and needs.

The Career Services Office initiates a comprehensive career planning program early in the first year of study beginning with self-assessment, then career exploration, and finally instruction and refinement of a range of job search skills. The methods used to deliver these services include individual advising sessions, classroom instruction, small group workshops, and seminars featuring corporate recruiters and alumni.

Early in the first term, students embark on a self-assessment of their skills, accomplishments, work styles, interests, and goals. Students are encouraged to revisit their self-assessment inventory throughout their two years of study. This knowledge forms the basis for developing a resume, cover letters, and interview themes. In addition, it helps the student identify areas for career exploration.

The Career Services Office provides many means for career exploration. In addition to a library of career books, articles, and audio-visual tapes, the office facilitates on-campus interaction between students and employers. The annual Job Fair attracts a range of businesses to Fuqua's campus early in the fall. This all day event, open only to Fuqua students, provides an excellent opportunity for students and employers to get acquainted and discuss job responsibilities and career paths in an informal atmosphere. Throughout the fall and winter, firms visit Fuqua each evening to host Special Interest Programs (SIPS) where employers and students discuss the company and career opportunities in more depth. Most SIPS open with prepared remarks on an audio-visual presentation by several company representatives, followed by a question and answer period where students and employers mingle in a social setting.

The Career Services Office staff is committed to preparing all students to face the challenges of a job search. The development of a solid set of job search skills and strategies is critical to successful long-term career management. The office works closely with each student to develop a resume that highlights each student's unique background and skills. Resume guidance begins with classroom instruction followed by individual

critiques with the professional staff. After completion of the resume, the Career Services Office and the Management Communication Center provide classroom instruction and individual guidance on writing persuasive job search correspondence to accompany the resume.

Focus then shifts to developing excellent interview skills. Training begins with classroom instruction on how to interview effectively, and then students participate in a Mock Interview Program. This video-taped interview provides students an opportunity to experience a realistic interview for a particular position of interest to them. Students then receive constructive feedback while reviewing the tape with a member of the office's professional staff. The Mock Interview Program is supplemented by a library of video-taped mock interviews conducted and critiqued by employers. The Career Services Office also administers a Recruiter Feedback Program where students further polish their interview skills based on interview feedback the office receives on each student from on-campus recruiters.

The Career Services Office helps students secure summer and permanent employment by managing an on-campus interview program, publishing employer job opportunity notices, and by advising students on individual job search strategies.

The comprehensive career planning program is designed to teach students job search and career planning skills that they will use not only to secure their first jobs after business school but throughout their career. In addition, Fuqua alumni may continue to use the resources of the Career Services Office at anytime in their career.



1992-1993 Participating Organizations

Advo Inc.
Aldus (PageMaker)
Alex. Brown & Sons Incorporated
Allied Signal Corporation
Amerada Hess Corporation
American Airlines
American Airlines - SABRE
American Enterprise Institute
American Express
American Express Travel Related Services
American International Group
American Management Systems, Inc.
American Power Conversion
Ametek, Inc.
Amgen, Inc.
Andersen Consulting
Arthur D. Little
AT&T
AT&T Universal Card Services
BancOne Corporation
Bankers Trust
Banque Paribas
Bayfront Medical Center
Beacon Development Company
Bear, Stearns & Company, Inc.
BellSouth Enterprises
B.F. Goodrich - Aerospace
B.F. Goodrich Company
Black & Decker
Blue Cross Blue Shield of Maryland
Brigham & Women's Hospital
Bristol-Myers Consumer Products
Bristol-Myers Squibb Company
Bronx Municipal Hospital
Burger King Corporation
Burlington Industries
Burlington Menswear
Burrhoughs Wellcome Company
Burrhoughs Wellcome Prescription Business
Calvert Social Ventures
CD Superstore
Centre Reinsurance
Champion Products
Charlton Memorial Hospital
Chase Manhattan Bank
Chemical Bank Corporation
Chesebrough-Ponds
Chrysler Corporation
Chugai Pharmaceutical Company, Ltd.
CIBY-GEIGY Corporation
CIBY-GEIGY Pharmaceuticals Division
Citibank
Citicorp Real Estate
Clairol
Coastal Group Inc.
Coca-Cola Company
Coca-Cola USA
Compaq Computer Corporation
Computer Sciences Corporation
Continental Bank
Coopers & Lybrand
Cordis Corporation
Cormetech, Inc.
Corning, Inc.
Crawford Long Hospital
D'Arcy Masius Benton & Bowles
Daiwa Institute of Research
Daiwa Securities Company Ltd.
Deloitte & Touche
Disney Development Company
Dole Fresh Fruit International
Domino's Pizza Inc.
Duke Energy Corporation
Duke Power Company
Dynamet Inc.
Eads & Heald Investment Council
Eli Lilly & Company
Eli Lilly International
Eli Lilly/IVAC
Eli Lilly/Medical Diagnostics & Devices
Emerson Electric Company
Equifax, Inc.
Ericsson GE
Ernst & Young
Ernst & Young Healthcare Consulting
Ethyl Corporation
Evian Waters of France
Exide Electronics Corporation
Exxon Corporation
Federal Bureau of Investigation
Federal Express Corporation
FHP Healthcare
Fidelity Investments
Fidelity Investments Brokerage Group
Fieldstone
First Chicago Corporation
First Union Corporation
FMC Corporation
Ford Motor Company
Frito-Lay, Inc.
Fuji Photo Film Company
Fuqua School of Business (Ph.D.)
Furniture Today
General Electric Capital Corporation
General Electric Company
General Electric Consumer Service
General Electric Corporate Audit Staff
General Electric International
General Foods USA
General Mills Restaurants, Inc.
General Motors Corporation
Glaxo Inc.
Glen Raven Mills

Goldman Sachs & Company
Great American Insurance Company, Inc.
GTE Mobile Communications
Hallmark Cards, Inc.
Hamilton-KSA
Haworth, Inc.
Health Insurance Association of America
Hewitt Associates
Hewlett-Packard Company
Home Automation Laboratories
IBM-Advantis
IBM Corporation
IBM Credit Corporation
IMS America
Information America
International Paper Company
Interstate Johnson Lane
Invermexico-USA
ITT Corporation
Jamaica Citizens Bank Ltd.
James River Corporation
John Hancock
John Snow, Inc.
Johnson & Johnson Consumer Products
J.P. Morgan & Company, Inc.
Kawasaki Steel Corporation
Kidder Peabody & Company, Inc.
Kimberly-Clark Corporation
KPMG Peat Marwick
Kraft General Foods, Inc.
Lazard Freres
Legg Mason Wood Walker, Inc.
Lehman Brothers
Lever Brothers
L&F Products
Lilly Medizintechnik GHBH
Lloyd & Company
Mallinckrodt
Mammoth Records
Marc Biver Development
Marithe & Francois Girbaud
Mars, Inc.
MBA Enterprise Corps
McChristian Companies
MCI Telecommunications Corporation
McKinsey & Company, Inc.
McNeil Consumer Products
McNeil Pharmaceutical
Medical Center of Delaware
Medimatrix
Mediplex of Stamford
Merck & Company, Inc.
Merck Human Health Division US
Merck, Sharp & Dohme
Merrill Lynch, Inc.
Methodist Hospital System, The
Metropolitan Life Insurance

Michelin Tire Corporation
Microsoft Corporation
Milliken & Company
Milliken & Michaels
Mobil Corporation
Mod-Pac Corporation
Morgan Stanley & Co., Incorporated
Moses Cone Memorial Hospital
Nabisco Foods
National City Corporation
NationsBank Corporation
NCCLP
NCR Corporation
Nestle USA, Inc.
Nippon Life Insurance Company
Nissho Iwai Corporation
Nomura Securities International
Northern Telecom/Bell Northern Research
Northern Telecom/Hakuhodo Advertising
Northern Telecom Inc.
NTT
Omni Services Inc.
Oppenheimer & Company, Inc.
PaineWebber, Inc.
PepsiCo Inc.
PepsiCo International
Pfizer, Inc.
PHH Fantus
Philip Morris USA
Pizza Hut, Inc.
Planters LifeSavers Company
Playtex Family Products Corporation
Price Waterhouse
Primerica Financial Services
Procter & Gamble Company
Procter & Gamble International
Promus Companies
Provident Life & Accident Insurance Company
Public Consulting Group, Inc.
Putnam Companies, The
Quaker Oats Company, The
RCS Technologies
Reckitt & Colman
Refrigeration Sales Corporation
Richland Memorial Hospital
Rohm and Haas Company
Rubbermaid Inc.
Ryder System, Inc.
Salomon Brothers, Inc.
Sara Lee Bakery
Sara Lee Direct
Sara Lee Hosiery
Sara Lee Intimates
Sara Lee Knit Products
Sara Lee Personal Products Group
SAS Institute
Schering-Plough Corporation

Scott, Madden & Associates
 Scott Paper Company
 Self-Help Ventures Fund
 Shaw, Pittman, Potts & Trowbridge
 Small Business Technology Development Center
 Smith Barney, Harris Upham & Company, Inc.
 Sonat, Inc.
 Sonat Offshore Drilling
 Speciality Department Stores
 Steelcase
 Strategic Decisions Group
 StrideRite Corporation
 Sulzer Brothers Ltd, Infra Group
 SunHealth Corporation (Presbyterian Hospital)
 Taco Bell Corporation
 Tasuda Trust & Banking Company, Ltd.
 Taylor & Company
 Texaco, Inc.
 The Boston Consulting Group
 The Dai-ichi Mutual Life Insurance Company
 The Industrial Bank of Japan
 The Mistui Trust & Banking Company, Ltd.
 The Sanwa Bank, Ltd.
 The Southern Company
 The Sumitomo Life Insurance Company
 The Sumitomo Marine & Fire Insurance Company
 Theodore Barry & Associates
 Thomson Consumer Electronics
 3Com Corporation

Tiber Group
 Timberline Woodcrafters
 Time-Life Books
 Toronto Dominion Bank
 Total Quality Trade Company
 Trader Publishing
 Trimeris
 Trone Advertising
 T. Rowe Price Associates
 TRW, Inc.
 U.S. Agency for International Development
 Unilever U.S. Consumer Goods Companies
 United Airlines
 United Bank of Switzerland Securities
 University of Texas
 U.S. General Accounting Office
 Wachovia Corporation
 Well, Cotshal & Manges Law Firm
 Wellman, Inc.
 Wendy's International, Inc.
 West Paces Ferry Medical Center
 Westvaco Corporation
 Wheat First Securities
 Wilson Sonsini Law Firm
 Windsor Group
 World Bank
 World Policy Institute
 Xerox Corporation
 Yukong Ltd.

Student Life



Living Accommodations

Most M.B.A. students live off campus in housing or apartments not owned by the university (see the section entitled *Off-Campus Housing*). However, Duke University has residential facilities in which some graduate and professional students may live.

Town House Apartments. Town House Apartments, located about three blocks from the main East-West Campus bus line, is a thirty-two-unit complex, which houses only graduate and professional school students. These apartments are more spacious than most apartments found on campus or in Durham. Because of their location away from the academic facilities, students find that these apartments offer a change from normal campus life and activities. They are available for continuous occupancy throughout the calendar year.

Each apartment includes a living room, a master bedroom, a smaller bedroom, a bath and a half, and a kitchen with a dining area. Spacious closets and storage spaces are provided within each apartment. A swimming pool, located in the center of the complex, is open during the late spring and throughout the summer months. All Town House Apartments are completely furnished by the university. An itemization of furnishings is included with the floor plans sent out in the application packet.

All utilities—water, heat, air-conditioning, and electricity—are provided. Residents must make arrangements with the local utility company to pay for telephone service. Usually a deposit is required when initial application for service is made. The utility company should be contacted prior to arrival as it usually takes several days to obtain service. Residents must provide their own phones.

Central Campus Apartments. Apartments in this 500-unit complex are available throughout the calendar year for continuous occupancy to single students attending graduate and professional school and undergraduate schools.

Located in the center of the complex is a swimming pool (open during the late spring and throughout the summer months), a convenience store, and a pub.

All Central Campus Apartments are completely furnished by the university. An itemization of furnishings is included with the floor plans sent out in the application packet.

All utilities—water, heat, air-conditioning, and electricity—are provided. Central Campus Apartments' residents are responsible for making arrangements with Duke University's Tel-Com telephone service to pay for telephone service. Residents must provide their own phones.

Efficiency, two-bedroom, and three-bedroom apartments are rented to students. Efficiency units are very limited in number and are generally not available to new

students. Spaces in apartments for single students are provided on an individual basis with each student paying rent per academic year to the university. This method permits students to share apartments with others of their choice. When this is impractical, the Department of Housing Management strives to place persons with similar interests together.

Application Procedures. When students are informed of their acceptance to the business school they will also receive a postcard on which to indicate preference for university housing. This postcard should be returned to the Department of Housing Management. Detailed information on the types of accommodations and application forms will be forwarded to the accepted student. Assignment to all university housing is made on a first-apply, first-assigned basis and is not guaranteed.

Off-Campus Housing. The Department of Housing Management maintains a listing of rental apartments, rooms, and houses provided by property owners or real estate agencies in Durham. These listings are available in the department only; during the summer an assistant is available to answer questions and aid students in their attempts to obtain housing off-campus. Information on commercial complexes in the Durham area may be obtained by indicating a preference for off campus housing on the postcard which you receive with your acceptance packet. Except for assuring that owners sign a statement of nondiscrimination, off-campus property is in no way verified and neither the university nor its agents negotiate between owners and interested parties.

The search for accommodations should begin as soon as possible after acceptance to the business school. A visit of two or three days will allow the opportunity to make use of the off-campus service and to inspect personally the availabilities.

Food Services

Duke University Food Services (DUFFS) operates a variety of dining facilities including "all you can eat" cafeterias, a la carte restaurants, fast food facilities, salad bars, seated dining restaurants, and an on-campus pizza delivery service.

Graduate and professional students may choose to pay for food purchases in cash, or they may opt to open a prepaid account. There are two accounts which a student may open—a food only dining plan and a flexible spending account. The flexible spending account may be used to purchase any food items sold by DUFFS, any items sold in the university stores, and to purchase beer and wine, where available.

For more information about opening either a flexible spending account or a dining account, contact the Auxiliary Services contract office at (919) 684-5800.

In addition to the above university food services, the Fuqua School of Business has its own cash-only snack bar, The Kiosk, which serves a limited menu of light snacks, sandwiches, and beverages during normal business hours.

Other Services

Bus Service. Free on-campus bus service is provided by the university connecting East, West, North, and Central Campuses, Science Drive and intermediate on-campus locations. Bus service is also provided between Duke Manor and Chapel Tower Apartments and the campus, during the academic year only. Printed schedules are available at the Bryan Center Information Desk, the Housing Management service offices, and from the transportation office located at 712 Wilkerson Avenue, just off East Campus behind Brightleaf Square. Schedules are also posted at each of the major bus stops.

Route, schedule, and employment information is available weekdays by calling (919) 684-2218.

University Stores. University Store operations on campus sell textbooks, school supplies, health and beauty items, room accessories, gifts, clothes, and food items. Items

may be purchased with cash, check, Visa or Mastercard, or on the Duke Card flexible spending account (see description under Food Services).

The Bryan University Center is the location of four of the stores' operations: the University Store sells school, office and computer supplies, and gift items with Duke University's official logos; the Duke University Bookstore sells textbooks, technical reference books, study aids, and computer software; the Gothic Bookshop stocks new fiction and nonfiction titles; and the Lobby Shop sells magazines, newspapers, health and beauty aids, and snack foods.

Student Activities

M.B.A. Student Association. The association serves as liaison between the students and faculty and administration in both academic and nonacademic matters. The structure of the association includes many standing and ad hoc committees dealing with concerns such as admissions and placement, computer and library facilities, intramural sports participation, alumni, and social events.

Cocurricular Activities. Graduate students at Duke University are welcome to use such university recreational facilities as swimming pools, tennis courts, and a golf course, and to affiliate with the choral, dance, drama, music, and religious groups. Doctoral students may become junior members of the American Association of University Professors and may affiliate with Phi Beta Kappa and social fraternities.

A full program of cultural, recreational, and religious activities is presented by the Office of Cultural Affairs, the Duke University Parish Ministry, the Duke University Union, the Office of Student Activities, and recreational clubs. The Duke University Union sponsors a wide range of programs through its committees which are open to all segments of the campus community. Included are touring Broadway shows; rock, jazz, and pop concerts; speakers; films; a film-making program; a student-run television station; art exhibits in two galleries; and a broad program in crafts located in Southgate Dormitory and the Bryan University Center.

The University Center complex includes the new Bryan University Center, which houses the Information Center, two drama theaters, a film theater, lounges, stores, meeting rooms, games room, rathskeller, art gallery, and other facilities; the West Union which includes dining facilities; and Flowers Building, which includes student publications, Page Auditorium, and the university box office.

Inquiries should be directed to the Intramural Office, 105A Card Gymnasium; the Office of Cultural Affairs, 107 Page Building; Duke Chapel; the Duke University Union, Bryan University Center; or the Office of Student Activities, Bryan University Center.

Full information regarding the scheduling of major events and programs for the entire year will be found in the Duke University *Annual Calendar*; detailed and updated information for the fall and spring semesters in the *Weekly Calendar*, available each Friday; updated information for the summer session in the *Summer Session Calendar*, published at the beginning of each summer term; and the *Duke Chronicle*, published each Monday through Friday during the fall and spring and each Wednesday during the summer. Copies of the Duke University calendars may be obtained at the information desk, Flowers Building, or the calendar office, Page Building. Also during the summer, the *Summer Session Newsletter* is published weekly by the summer session office and is available at convenient locations.

Intramural and Recreational Sports. The Duke recreational and intramural programs provide all students with opportunities to participate in some form of healthful, informal, and competitive physical activity. In a typical year, more than 3,000 students compete for many intramural titles and trophies.

The men's and women's intramural programs include many different activities (e.g., bowling, cross-country, golf, handball, horseshoes, table tennis, volleyball, soccer,

softball, and track). In addition, special events in other areas of interest are held. Various performing clubs, including one for water ballet, offer the student opportunities to take part in extracurricular activities. Through coeducational intramurals, the student is encouraged to participate on a less competitive level, promoting relaxed social and physical activity. Opportunities for competition between men and women are provided in areas that include archery, badminton, basketball, softball, racquetball, squash, table tennis, tennis, volleyball, and water polo.

The university's varied athletic and recreational facilities and equipment are available for use by students. The facilities for recreation include a golf course, lighted tennis courts, three swimming pools, squash and racquetball courts, three gymnasiums, a weight training room, outdoor handball and basketball courts, an archery range, horseshoe courts, an all-weather track, numerous playing fields, jogging and exercise tracks, and informal recreational areas. More than thirty sports clubs dealing with gymnastics, scuba diving, sailing, cycling, crew, riding, fencing, football, frisbee, ice hockey, kayaking, lacrosse, badminton, karate, rugby, soccer, and other activities are available to interested students.

Graduate and Professional Student Council. The Graduate and Professional Student Council is the representative body for the students of graduate departments and professional schools. The council provides a means of communication between schools and between graduate students and the administration. The council selects graduate students for membership on university committees. Representatives of each department and officers of the council are selected annually.

Religious Life. The Duke Chapel is open daily for prayer and meditation. The Sunday morning worship in the Chapel at 10:55 A.M. is the central focus for university religious life. The Chapel Choir is open to those who wish to sing in it. The Benjamin N. Duke Memorial Organ is played Monday through Friday from 12:30 P.M. to 1:30 P.M. Special guest recitals are also scheduled. The ministers and other members of the Chapel and Religious Life staffs are available to provide counseling help and other assistance as needs arise.

Health Care

Medical Care. The aim of the Student Health Service is to provide any medical care and health advice necessary to the student as a member of the university community. The health service maintains the Student Health Services Clinic located in the Pickens Building on West Campus. Emergency transportation can be obtained by the Duke campus police. A separate fee for the Student Health Service is assessed.

The Student Health Services Clinic offers the student outpatient services, routine laboratory and X-ray examinations in the clinic for the treatment of acute illness or injury, and advice and assistance in arranging consultation for medical treatments. Fees for such consultations or treatments must be paid by a student who is not covered by an insurance plan.

The facilities of the University Infirmary, located in Duke Hospital South, are available to all currently enrolled full-time students in residence during the fall and spring. Hospitalization in the University Infirmary is provided for treatment of acute illness or injury as authorized by the Student Health Services Clinic physician. Students are required to pay for their meals while confined to the infirmary. The resources of the Duke University Medical Center are available to all Duke students and their spouses and children. Any bills incurred at Duke Hospital or any other hospital are the responsibility of the student, if not covered by an insurance plan. The Student Health Program does not provide health care for spouses and dependent children of married students. Coverage of the married student's family is provided in the university's Student

Accident and Sickness Insurance Plan for an additional fee. Refer to the chapter, "Financial Information," for complete information on this plan.

Counseling and Psychological Services. CAPS provides a comprehensive range of counseling and psychological services to assist and promote the personal growth and development of Duke students. The professional staff is composed of clinical social workers, psychologists, and psychiatrists experienced in working with young adults. Among services provided are personal, social, academic, and career counseling. A number of short-term seminars or groups focusing on skills development and special interests such as coping with stress and tension, fostering assertiveness, enriching couples' communication, and dealing with separation and divorce are also offered. A policy of strict confidentiality is maintained concerning information about each student's contact with the CAPS staff. Individual evaluation and brief counseling/therapy as well as career and skills development seminars are covered by student health fees. There are no additional charges to the students for these services. Appointments may be made by calling (919) 660-1000 or visiting CAPS, 214 Page, West Campus.

Academic Procedures and Information



Registration

Students enrolled in the Fuqua School of Business must register each semester until all degree requirements are completed. New matriculants register during orientation week. Each student must complete a course card listing the course work to be taken during the semester. In the case of independent studies, courses outside the school and overloads, it will be necessary to obtain the permission of the instructor and the M.B.A. program director.

Late Registration. All students are expected to register at the times specified by the university. A late registration fee of \$50 is charged any student registering late.

Change of Registration. During the first *week* of the semester, registration may be changed with approval of the Fuqua program director.

Academic Requirements for the M.B.A. Program

Grading. The grading scale for M.B.A. students is: Superior Pass (*SP*)-4.0; High Pass (*HP*)-3.5; Pass (*P*)-3.0; Low Pass (*LP*)-2.5; and Fail (*F*).

Continuation Requirements. An M.B.A. student is expected to complete all courses approved by the program director for a given semester and attain a GPA of 3.0 to proceed to the next semester of the program.

Any student who receives a grade of fail (*F*), or a grade point average of less than 3.0 after any term, will be subject to academic performance review. The student's academic standing is determined during the performance review by the respective program director and the faculty of the Curriculum Committee. Any mitigating circumstances that may have inhibited a student from making satisfactory progress will be heard and evaluated at that time.

In order to be certified as making satisfactory progress toward the degree, a student enrolled in the M.B.A. program must:

1. Complete all courses approved by the program director for a given semester and attain a GPA of 3.0 or: have been reviewed by the program director and faculty of the Curriculum Committee, where it must be determined that mitigating circumstances did inhibit the student from meeting all course

requirements or attaining a 3.0 GPA. Under these circumstances the student will be allowed to continue the program with a GPA below 3.0 and still be considered as making satisfactory progress toward the degree.

2. Complete the program according to the following schedule: a minimum of 48 credits in the first academic year of the program, and 85 credits by the end of the second academic year of the program.

Students enrolled in the Evening Executive M.B.A. Program must complete a minimum of 24 units during the first academic year and 24 units during the second academic year.

Students enrolled in the Weekend Executive M.B.A. Program must complete a minimum of 18 units during the first academic year and 27 units during the second academic year.

Students on official leaves of absence from any program will be exempted from these requirements for the duration of that leave.

Graduation Requirements. An M.B.A. student who has successfully completed all program requirements and has earned a grade point average of at least 3.0 will be graduated.

Course Exemptions. It is possible to obtain an exemption from any of the first year required courses. This may happen in one of two ways. The first is administrative exemption, that is, transcripts of entering students are reviewed prior to their arrival and exemptions are offered in areas where prior satisfactory course work is documented. This first method of exemption is applicable only to daytime M.B.A. students. The second is by passing an exemption exam in the subject matter of that course.

Standards of Conduct. Duke University expects and will require of all its students' cooperation in developing and maintaining high standards of scholarship and conduct. The university wishes to emphasize its policy that all students are subject to the rules and regulations of the university currently in effect or which are put into effect from time to time by the appropriate authorities of the university.

Any student in accepting admission indicates a willingness to subscribe to, and be governed by, these rules and regulations and acknowledges the right of the university to take such disciplinary action, including suspension and/or expulsion, as may be deemed appropriate, for failure to abide by such rules and regulations or for conduct adjudged unsatisfactory or detrimental to the university.

The Fuqua School of Business has established its own Honor Code which is overseen by a Judicial Board comprised of three faculty and three student members. The Honor Code governs conduct and the integrity of student scholarship.

Commencement

Graduation exercises are held in May for daytime students and in October for executive M.B.A. students. At this time degrees are conferred and diplomas are issued to those who have completed requirements.

Other Information

Student Records. Duke University adheres to a policy permitting students access to their student records, with the exception of confidential letters of recommendation received prior to January 1, 1975, and certain confidential financial information. Students may request review of any information which is contained in their student records and may challenge the content of their records by appropriate procedures. An explanation of the complete policy on student records may be obtained from the associate registrar of the university.

No information contained in student records (academic or otherwise) is released to persons outside the university or to unauthorized persons on the campus, without the consent of the student. A student grants consent by signing a form which authorizes the release of data. Specific consent is required for the release of information to any person or organization outside the university, and it is the responsibility of the student to provide the necessary authorization and consent. Official transcripts may be sent by the university registrar at the signed request of the student and upon receipt of a \$3 processing fee.

Reciprocal Agreements with Neighboring Universities. Under a plan of cooperation between Duke University and the University of North Carolina at Chapel Hill, the University of North Carolina at Greensboro, North Carolina Central University in Durham, and North Carolina State University at Raleigh, students properly enrolled in the Fuqua School of Business during the regular academic year, and paying full fees to this institution, may be admitted to a maximum of two courses per semester and four courses total at one of the other institutions in the cooperative plan. Under the same arrangements, students in the graduate schools in the neighboring institutions may be admitted to course work at Duke University. All interinstitutional registrations involving extra-fee courses or special fees required of all students will be made at the expense of the student and will not be considered a part of the Duke University tuition coverage.

Identification Cards. Graduate students are issued Duke University identification cards which they should carry at all times. Students must validate the card each semester with the university registrar. The cards are the means of identification for library privileges, athletic events, and other university functions or services open to them as university students. Students will be expected to present their cards on request to any university official or employee. The cards are not transferable, and fraudulent use may result in loss of student privileges or suspension. A student should report the loss of a card immediately to the registrar's office. The cost of a new identification card is \$5.

Courses of Instruction



Master of Business Administration

Core and Elective Courses-300 Series

The core curriculum of the M.B.A. Program is on page 14 of this bulletin. Unless specified otherwise, each course is worth three units of credit.

300. Managerial Economics. This course considers how the actions of business firms, consumers, and the government—operating within a price system in a decentralized market economy—answer such basic resource allocation questions as what will be produced, how it will be produced, who will consume what is produced, and what resources to divert from present consumption to increase future consumption. The impact of various types of market structures (such as perfect competition, monopoly, and oligopoly) on economic efficiency will be discussed. Provides the student with an ability to view resource allocation problems within a constrained optimization framework and with some practice in applying marginal analysis. 3 units. *Staff*

301. Economic Environment of the Firm. This course provides an analytical framework for understanding the economic forces that shape business decisions. It examines the behavior of unemployment, inflation, the trade balance, interest rates, and exchange rates. Special emphasis is placed on government policy towards these variables and current economic problems. 3 units. *Staff*

303. Microeconomics for Managers. Provides an alternative to Business Administration 300 for those students with intermediate or advanced backgrounds in mathematics. Both courses address the same topics. They develop the students' ability to apply economics to understanding the market environment in which managerial decisions are made and provide a structure for the managerial decision-making process. Prerequisite: intermediate or advanced knowledge of business mathematics. 3 units. *Staff*

311. Probability and Statistics. Examines structures for managerial decision making under conditions of partial information and uncertainty. After developing a foundation in probability theory, the course extends this foundation to a set of methodologies for the analysis of decision problems. Included are topics in probability, statistical inference, and regression analysis. 3 units. *Staff*

312. Decision Models. Examines the principles and techniques of building quantitative models to aid managerial decision making. Special emphasis is placed on utilizing models for structuring and analyzing resource allocation problems and decision problems under uncertainty. Topics include linear programming, decision analysis, and simulation. 3 units. *Staff*

320. Managerial Effectiveness. Provides an introduction to the study of the behavior of individuals and groups within organized settings. The relationship of organizations to their environments is also examined. Emphasis is given to managerial strategies which enhance organizational effectiveness. Topics include leadership, selection and training, motivation and reward systems, decision making, conflict management, and organization structure and design. A mixture of lectures, cases, and experimental exercises is used to develop managerial skills. 3 units. *Staff*

330. Financial Accounting. Introduces the student to the types of information requirements imposed on the firm by agencies in its environment and develops an understanding of the activities of the firm within the framework of a financial accounting system designed to satisfy these information requirements. Emphasis is given to the study of financial accounting, reporting, and measurement problems from a theoretical and an applied basis, using cases and topical problems in financial accounting as a foundation for the learning experience. 3 units. *Staff*

331. Managerial Accounting. Focuses primarily on managers who are users rather than preparers of accounting information. Examines the use of accounting information in its major functions of planning, control, and product costing. Specific topics include cost estimation, budgeting, standard costing, control and performance evaluation, cost allocation, information systems, data limitations, and rational decision making using accounting information. 3 units. *Staff*

341. The International Environment. This course seeks to analyze the major social, political, cultural, economic, and legal dimensions of the changing world environment, the institutions and policies through which different communities control the activities of the business firms and the impact of these forces on the business firm. The environment is treated holistically and the nation state is analyzed assuming the actions of national governments are made to achieve national strategies and that these actions are important determinants of the business environment. 3 units. *Staff*

342. Ethics in Management. The objective of the course is to achieve an awareness of ethical dilemmas that arise in the conduct of business within a corporation and between a corporation and its many constituencies. It also will sharpen diagnostic skills in analyzing ethical issues and in devising personal and organizational responses. The course examines ethical dilemmas arising in relationships between the firm and its customers, vendors, competitors, employees, investors, society, and local communities and the relationships between employees and of employees to the firm. The course will trace the evolutionary emergence of ethical and moral expectations in western civilization considering societal responses for resolving ethical issues. 3 units. *Staff*

343. Managing the Governmental Relationship. Provides the student with an ability to understand and manage private sector problems and opportunities created by government programs. By examining the processes used by the legislative, executive, and judicial branches to create, implement, and enforce laws and regulations, the prospective manager will be prepared to compete effectively in markets controlled or affected by government activities. The course will consider the management problems created by the United States antitrust laws and various government agencies regulating environmental hazards, energy, and health and safety. 3 units. *Staff*

344. International Strategy. Examination of the reasons for location of production in the world, laying the conceptual foundations for three levels of analysis: the country, the industry, and the firm. It extends competitive analysis to a multinational context, analyzing the globalization of markets and the way market factors, technological shifts, governmental policies, and other factors cause a shift in the comparative advantage of firms. The course also deals with the impact of strategic choices of government/business interaction in both developed and developing countries, and implementation issues of how strategic changes are managed across borders. 3 units. *Staff*

345. Legal Environment of the Firm. Considers the legal environment of the firm with emphasis on the legal system, the process by which laws are formulated and changed, and the type and forms of legal constraints imposed on firms. Also examined are major legislation, court cases, and regulation by federal agencies which affect the firm's decisions. Prerequisite: second-year standing in the Master of Business Administration program or consent of instructor. 3 units. *Staff*

350. Financial Management. Provides an overview of corporate finance, financial markets, portfolio diversification, and asset pricing. Since firms must understand financial instruments and how the market views them before making decisions about which ones to use, fundamental issues and models of risk, return, and asset pricing are presented. Exercises and cases require students to project short-term and long-term financial needs, value bonds and stocks, and critique capital budgeting techniques. Futures and options markets are introduced, and students briefly manage portfolios of those contracts. Major corporate finance issues of debt and dividend policies are examined. 3 units. *Staff*

360. Marketing Management. Provides an overview of the marketing function in business firms by acquainting students with the fundamental issues and decisions involved in planning and managing marketing activities. Attention is given to the strategic marketing decisions of new product development, product policy, pricing, advertising and communications, marketing research, personal selling, and channels of distribution. Major emphasis is placed on developing an understanding of the underlying forces which influence marketing decisions, including buyer behavior, competitive marketing activity, organizational considerations, and governmental regulation. 3 units. *Staff*

370. Operations Management. Covers issues in the design, planning, and control of the process by which goods are manufactured and services are delivered. Specific topics include analysis of production processes, total quality management, managing process technology and innovation, productivity and work-force management, production planning and control, and the strategic role of operations in the firm. 3 units. *Staff*

380, 381, 382, 383, 384. Individual Effectiveness. These courses integrate the expertise of the Computer Center, the Management Communication Center, and the Career Services Office to provide both immediate and long term benefits to students. Objectives include: (1) providing timely computer education and support in core courses; providing instruction on software tools to enhance managerial decision making; (2) providing opportunities to develop the personal interaction capabilities necessary for success in the Fuqua School and in managerial careers; and (3) acquainting students with the challenges in career planning and development; equipping students with the skills necessary to prosper in the placement process. 380, 382, 383, 384-2 units each; 381-0 units. Variable credit. *Staff*

401. Integrative Learning Experience 1. The primary objective of the first ILE is to provide experiential and classroom-based personal development opportunities in teamwork, leadership, and social responsibility. 2 units. *Staff*

402. Integrative Learning Experience 2. The second ILE is designed around two main topics: the management of quality and the management of diversity. 2 units. *Staff*

403. Integrative Learning Experience 3. This ILE provides students the opportunity to use a computer-based, strategic-management simulation to operate a company in a competitive environment. 2 units. *Staff*

404. Integrative Learning Experience 4. During the final ILE students address from a general management perspective a major contemporary and controversial issue that has the potential to shape the course of business over the next decade. The issue requires political, economic, historical, cultural, and legal and cross-functional considerations. 2 units. *Staff*

410. Decision Analysis. Managers must operate in an environment with many uncertainties, and they are faced with a variety of risky choices involving many conflicting factors. They need to take account of uncertainties and multiple objectives and to select appropriate risk postures. Decision analysis provides a framework for analyzing

decision-making problems under uncertainty by breaking them down into more manageable parts. The study of decision analysis involves some formal methods, but perhaps even more important, it suggests a useful way of thinking about and approaching risky decisions. 3 units. *Staff*

411. Statistical Forecasting. Increased access to computer data bases and modeling tools presents the modern manager with opportunities and challenges to use statistical data analysis in forecasting, planning, and decision-making. This course will cover the use of major statistical forecasting techniques, including multiple-regression and time-series models, that are applicable in many functional areas of business. It will emphasize hands-on computing with a microcomputer statistics package. 3 units. *Staff*

412. Operations Research Methods. Surveys the methodologies of operations research and shows how they can be applied to decision-making situations. The course will be concerned primarily with selecting which tool to use in various situations, rather than algorithmic details. Topics to be covered include dynamic programming, stochastic programming, integer programming, nonlinear programming, Markov chains, inventory theory, and linear model formulation. 3 units. *Staff*

413. Quality Control. The objective of this course is to study issues relating to the management of quality. Special attention is paid to tools for data analysis. The application of statistical procedures, the interpretation of results, and the implications for managerial decisions are highlighted. 3 units. *Staff*

414. Applied Econometrics. The purpose of this course is to give students hands-on experience in applying econometric tools, primarily regression analysis, to analyze both classic and contemporary data sets. The course extends the introductory statistics course by providing extensive applications of the tools of regression analysis. It complements the elective in time-series analysis, but there is very little overlap between the two electives. The course is designed for quantitatively-oriented students who wish to learn more about statistical analysis and who wish to develop the ability to estimate statistical models derived from both micro- and macroeconomic theories. 3 units. *Moore*

421. Power and Politics in Organizations. Examines the interplay of power and politics in organizational settings with particular emphasis on the use of influence strategies in managerial decision making. Specific topics to be included are understanding the role of power in organizations, its sources and conditions for use, political strategies and tactics, and specific organizational issues such as resource allocation, career politics, organizational change, and retrenchment. Relevant research and theory will be examined but students will be encouraged to make practical application in decision-making situations through case analyses and discussion, and the development of personal skills in the politics of management. 3 units. *Staff*

422. Dynamics of Bargaining. Explores the processes of bargaining and negotiation; the dynamics of interpersonal and intergroup conflict; and understanding of theory and research related to processes of influence, negotiation, and conflict management. A second part will emphasize skill development through extensive case analysis, role playing, and simulation. 3 units. *Staff*

423. Strategic Human Resource Management. Provides an understanding of issues and challenges involved in the management of human resources in contemporary, complex organizations. The topics discussed include employee selection and placement, training and development, compensation and reward systems, performance evaluation, career development, human resource planning, international human resource management, and the contribution of human resource management to overall organizational effectiveness. The cultural and legal contexts of human resource practices are also addressed. Perspectives for this course are from the line or operating managers primar-

ily. The roles of the personnel department and the personnel specialists are evaluated. 3 units. *Staff*

424. Managerial Leadership. Explores what is known about effective management and leadership in organizations, and helps prospective managers identify and improve their own leadership skills. To achieve these purposes, the course will alternate between a review of past research on organizational leadership and practical skill development. Readings and class discussion will provide exposure to various models of effective managerial behavior. Students will have an opportunity to experiment with, observe, and practice the skills being considered. Topics include leadership style, organizational politics, decision making, appraising performance, planning and time management, improving group effectiveness, and conflict management. Prerequisite: second-year standing in the Master of Business Administration program or consent of instructor. 3 units. *Staff*

425. Managerial Decision Making. Focuses on helping managers to understand and improve decision making. The primary objective is the development of skills in the use of computer-based decision aids that exploit the intellectual strengths of humans while overcoming their cognitive limitations. Of particular interest will be the techniques of risk and decision analysis. Case discussions, experiential exercises, as well as lectures, will be used to help develop an appreciation of the potentials of various decision aids. Prerequisite: second-year standing in the Master of Business Administration program or consent of instructor. 3 units. *Staff*

426. Organizing Business Activities. The object of this course is to understand the nature of the problems of organizing so that the solutions that emerge match the part or the whole of the organization to its goals, and to make both these fit the internal and external environments. The work includes readings, cases, and examinations of actual contemporary organizing problems and decisions. This course is intended for the student who is interested in getting it together, making it happen, writing the playbook, and staying with it. Prerequisite: second-year standing in the Master of Business Administration program or consent of instructor. 3 units. *Staff*

428. Managing Technology and Innovation. Examines managing innovation, new technology, new product development, and research in the changing enterprise. Topics include the management of project selection, project implementation, manpower and resource allocation among competing activities, budgeting, productivity measurement and enhancement, conflict and coordination among organizational subunits, adaptive organizational subunits, adaptive organizational forms, devising incentives and reward schemes for engendering new ideas, and risk taking. The course will use a combination of readings, lecture/discussions, cases, and guest lectures by managers. Students are encouraged to do field studies. Prerequisite: second-year standing in the Master of Business Administration program or consent of instructor. 3 units. *Staff*

429. Managing the Professional Service Organization. This course examines the management of professional service organizations, with emphasis on the management of health service organizations. Professional service organizations include health, law, accounting, education, engineering, and architecture. 3 units. *Staff*

430. Financial Accounting Standards and Analysis I. Examines problems of asset and liability valuation and the related issues of income determination from the perspective of the professional accountant. The information needs of financial statement users are emphasized. Frequent reference is made to professional accounting pronouncements. Prerequisites: Master of Business Administration standing, one course in financial accounting, and one course in managerial accounting. 3 units. *Staff*

431. Financial Accounting Standards and Analysis II. Examines advanced topics in financial accounting from the perspective of the professional accountant. Specific attention is devoted to the accounting and reporting problems of complex corporate enterprises. Topics include consolidated financial statements, partnerships, and not-for-profit accounting. Prerequisite: Business Administration 430. 3 units. *Staff*

432. Measurement and Control of Product Costs. Study of the relationship between product costing systems and strategic analysis. Strategic planning depends heavily on the output of cost accounting systems, and decisions based on incorrect product costs are likely to be wrong. Furthermore, productivity improvements cannot usually be made unless reliable cost data are available. Recently many firms have discovered that their cost systems do not supply reasonable information. Apparently profitable products actually lose money, and relevant data for decisions are not obtainable. Use of case studies and articles to examine why many cost systems are unsatisfactory, what the symptoms of cost system failure are, and how appropriately to structure an improved system. 3 units. *Staff*

433. Management Planning and Control. The aim in this course is more effective use of information in management, through, for example, statistical models for forecasting, probability models for control, and management science models for planning. The course also explores, from a more qualitative perspective, broad issues of control and performance evaluation in service industries, not-for-profit organizations, and multinational operations. 3 units. *Staff*

435. Management Information Systems. Examines the role of the Accounting Information System (AIS) in supporting the management control system and the strategic planning process within the organization. Specific attention is given to the problems of design and operation of the AIS, the role of information in planning and control, technologies of information systems, dynamics of information flows and the problem of fraud in the computer-based AIS. 3 units. *Staff*

436. Auditing. Examines the concepts and methods of auditing. Course content focuses primarily on what audits are (and are not), why they are done, and how they are done. Current regulatory, legal, and ethical issues are examined, as well as the value and limitations of financial and managerial accounting in business organizations. Relevant not only for those interested in professional auditing, but also for those who plan careers in business management and management consulting, particularly in accounting firms. 3 units. *Staff*

437. Financial Statement Analysis. Starts by describing a systematic approach to analyzing financial statements and to studying ratio analysis (over time and in cross-section), industry analysis, and cash flow analysis. Since these tools only indicate how firms have performed in the past, the course introduces tools to extrapolate past performance to the future: cash flow forecasts, firm valuation, and sensitivity analysis. The analysis of earnings quality is emphasized by examining various ways in which reporting options affect income, cash flows, financial ratios and trends. Applications such as credit analysis, growth analysis, corporate restructuring and international financial analysis are covered. 3 units. *Staff*

440. Corporate Strategy. This course focuses on the major phases of the strategic planning process within business organizations. Considerations involving the various functional areas of management are integrated to permit meaningful decisions concerning the product-market posture of the firm. Topics relevant to the design and implementation of strategic planning are explored within a number of different contexts: entrepreneurial, innovative, diversified, mature, and professional. 3 units. *Staff*

442. Entrepreneurship and New Venture Management. Provides an intensive, tutored field study of the formation of new business ventures. Students work in teams to develop market, strategic, operations, and financial aspects of original ideas toward completion of a full business plan. Entrepreneurs and new venture investors advise students on the progress of their work and evaluate final plans. 3 units. *Staff*

445. Business Planning. Presents corporate, security, and tax issues for analysis and resolution through examining a series of problems involving common business transactions. The problems will include such topics as the formation of closely-held and public corporations, stock redemption, the sale of a business, merger and other types of combination transactions, and recapitalization, division, and dissolution of corporations. 3 units. *Staff*

446. Federal Income Taxation. The course examines the Federal income tax system as it applies to corporations and partnerships. Selected topics include concepts of income and exclusions from income, deductible expenses, credits, property transactions, depreciation, depletion, nontaxable transactions, penalty taxes, distributions, redemptions, reorganizations, and liquidations, employee expenses and compensation programs, multistate taxation, and the taxation of international transactions. 3 units. *Staff*

447. Strategic Management for Health Services. (Capstone course for the HSM concentration) Considers the strategy and operation of the health service institution, especially hospitals, from a top-management view. A major focus is the integration of human resources, marketing, operations, finance, information systems, and quality of care issues from the corporate view. Special issues in ethics and culture are also considered. 3 units. *Staff*

448. Health Care Policy. Examines special aspects of health care law, financing, and health care policy. The provision of health care in the United States exists within a unique and complex environment. Local, state, and federal governments, through laws, programs, reimbursements and payments, create a special environment for health care providers. More recently, corporations are taking active steps in modifying this environment. 3 units. *Staff*

449. Cultural Setting of Business. This course studies culture. The course defines culture and identifies the relevant dimensions to be used in the description of any of the many different cultures of the world. Two sets of dimensions are identified, those that differ by subject and those that differ by logical nature. The first constitutes the parts of the culture, e.g., religion, politics, business, etc. The second identifies the components of a culture, those things that define a culture and every part of it. These are the concepts of truth, the beliefs, the values, the logic, and the decision rules. A culture of a people may be described in terms of either set of dimensions. 3 units. *Staff*

450. Short-Run Financial Management. Examines the financial management and control of a firm's short-term assets and liabilities. Topics include cash management, collection and disbursement techniques, management of the firm's short-term investment/borrowing portfolio, cash forecasting, receivables management, and the management of the firm's bank relationships. 3 units. *Staff*

451. Advanced Corporate Finance. Examines in depth the major financial decisions faced by the firm. Topics include dividend policy and capital structure decisions of the firm, as well as the pricing of various financial instruments. While the major emphasis of the course is on the traditional and recent theories regarding corporate financial decision-making, much time is devoted to the consideration of empirical evidence supporting/refuting the various theoretical propositions. Time permitting, some special topics such as mergers and acquisitions and lease financing will be considered. 3 units. *Staff*

452. Money and Capital Markets. Considers the structure and behavior of capital markets. The course includes a discussion of the institutional framework of the American capital market as well as the major international markets, although the emphasis is on the theoretical foundation for analyzing interest rates and funds flow in those financial markets. Included among the topics is an extended discussion of monetary theory, the term structure of interest rates, and the analysis of risk in financial markets. 3 units. *Staff*

453. Investment Management. Focuses on the fundamentals of security valuation and portfolio selection in an informationally efficient and efficiently-functioning capital market. Topics covered include portfolio theory, risk and return in asset pricing, the role of arbitrage, and the measurement of portfolio performance, with emphasis being placed on the application of financial theory. The types of security markets discussed include stocks, bonds, financial futures and options. Both theory and empirical evidence are considered. Students are required to carry out homework exercises involving the use of microcomputer software. 3 units. *Staff*

454. Management of Financial Institutions. Develops a framework for understanding financial intermediation and its role of providing the conduit for the flow of funds through the economy. Considers the sources and uses of funds in the economy and how commercial banks and other financial institutions act as agent on behalf of both savers and users of funds. Examines the structure and operations of the Federal Reserve System and its effect on commercial banks. 3 units. *Staff*

455. Futures and Options Markets. Focuses on the use of futures and options contracts in the financial management of corporations and the management of security portfolios. In the futures area emphasis is placed on interest rate futures, currency futures, and stock index futures. General pricing of agricultural futures is also studied as well as the use of agricultural and other contracts in diversifying security portfolios. In the options area emphasis is placed on the use of stock options in the financial management of stock portfolios. Interest rate options and the use of option pricing models in the formulation of optimal option investment strategies are also studied. 3 units. *Staff*

456. Corporate Finance. Examines the implications of modern financial theory for various decisions faced by corporate financial officers. Topics include capital budgeting, capital structure, the cost of capital, dividend policy, mergers and acquisitions, option pricing, and international financial management. Theory, empirical evidence, and case analysis all play significant roles in the course. Theory and empirical evidence together yield implications for corporate financial decision making. Case analysis forces students to apply their knowledge of theory and evidence to real-world situations. 3 units. *Staff*

457. Corporate Restructuring. This course will focus on some of the important managerial problems associated with corporate restructuring, i.e., business ventures that are strategically important, particularly projects related to new expansion, acquisitions, management buyouts, leveraged buyouts, divestments, and recapitalization. Both financial and strategic tools and techniques will be emphasized. Specific financial topics included will be alternative economic criteria, interpretation of study results and their use in decision making, and strategic valuation. The point of the course is that strategically important decisions must be based on sound analyses of both the financial and the strategic implications of the decision. 3 units. *Staff*

458. Equity Markets: Trading and Market Making. Focuses on the structure and regulation of the equity markets, the operations of dealers and specialists, and the performance of the markets. The objective is to convey an understanding of how prices are determined in the marketplace. Particular attention is also given to how investor

trading strategies should take account of the costs of trading, liquidity, and the rules and protocols by which orders are handled and translated into trades. 3 units. *Staff*

459. Investment Banking. Develops a fundamental understanding of the many roles of investment banking firms in the capital marketplace. As financial intermediaries, investment banks originate, underwrite, and distribute new security issues, serving both their issuing clients and their investing customers. Investment bank services may also include advising clients, arranging lease financing, arbitraging profit opportunities, placing unregistered securities, and providing broker and dealer services. Topics include markets and market making, and syndication and underwriting. Corporate finance decisions pertaining to investment banks (e.g., mergers and tender offers) are also considered. 3 units. *Staff*

460. Advanced Marketing Strategy. Considers in greater depth the process of strategic planning in the marketing function and its relation to corporate strategy. Offers an opportunity to sharpen and extend analytical skills in marketing as well as to synthesize understanding of the managerial, organizational, and environmental aspects of marketing activity. 3 units. *Staff*

461A. Marketing Research: Problem Formulation and Design. Focuses on understanding data relevant to marketing managers, the types available, experimental design, methods of collection and examination. Learn to define a research goal, create an effective measurement instrument (survey, focus group, store sample), and process the resulting information for subsequent analysis. Emphasizes how the marketing research process is carried out. 3 units. *Staff*

461B. Analysis for Marketing Decisions. Emphasizes analysis of marketing research information as an aid to decision making. Topics to be covered include: conjoint, discriminant, and factor analysis, analysis of variance, and multidimensional scaling. Emphasis is on interpretation of results, rather than on the details of the algorithms. 3 units. *Staff*

462. Consumer Behavior. Provides an opportunity for advanced study of the behavior of consumers. Objectives include (1) increasing the prospective manager's sensitivity to and understanding of consumers and the psychological, sociological, and anthropological forces which shape their behavior, and (2) enabling the student to apply this knowledge in arriving at improved marketing decisions. 3 units. *Staff*

463. Marketing Communications. Includes the management of advertising, promotions, public relations, and the other more subtle ways companies communicate with their customers. Objective is to provide an approach to management that is thoughtful, sophisticated, and state-of-the-art, while being practical and relevant to "real world" communications planning, decision making, and control. 3 units. *Staff*

464. Product Management. This course develops an understanding of the roles, activities, and responsibilities of the modern product manager. The classes consist of lectures, case discussions, group presentations, and "live cases" involving a current problem of an actual company. The cases are largely taken from package goods companies and from their advertising agencies, retailers, or wholesalers. In addition, students consider related cases involving the management of services or durables, such as airlines or automobiles. Throughout, students use the kinds of market research data, such as panel, survey, or test market data, that product managers use to understand the impact of their actions on markets. 3 units. *Staff*

465. Industrial Marketing. This course is designed to expand your ability to resolve problems and uncover opportunities in industrial markets. You will also be exposed to a number of current topics in industrial marketing, such as partnerships and the impact of total quality management. This course will focus on the areas of salesforce manage-

ment, strategic market and product selection, pricing, and distribution policy. 3 units. *Staff*

466. Channel and Distribution System Management. Examines formulation and solution of problems involving strategies and decisions on the firm's relations with other elements that make up its different market environments. Decision problems on the choice of forms and levels of cooperation and competition with other organizations are analyzed. The efficiency of different forms and structures of marketing channels and distribution systems is discussed and determined. Specific problems studied include: decisions on the allocation of marketing activities and resources; the coordination of activities and levels; the coordination and control of advertising, selling efforts, prices, etc. of sellers and resellers. Lectures, discussions, and cases. 3 units. *Staff*

467. Marketing of Services. Supplements the basic marketing and marketing strategy courses by focusing on problems and strategies in service businesses. Addresses problems encountered in services such as internal marketing, warranties, and assessing quality. Emphasizes services in general rather than any particular industry. Uses cases, examples, and exercises from a variety of industries such as banking, health care, financial planning, consulting, the professions, sports marketing, and communication. The course is designed for students with career interests in service industries as well as goods industries with high service components. 3 units. *Staff*

469. International Marketing. Develops students' knowledge of theoretical concepts and practical aspects of marketing for firms competing in countries with different cultural, legal, economic, and political environments. Designed both for those who plan to work for multinational companies and those who want to enrich their knowledge of the international marketplace. 3 units. *Staff*

470. Operations Planning and Control. Focuses on tactical issues relevant to the management of material, labor, equipment, and inventories in production/distribution systems. Advanced models are formulated to structure the relationship between key decision variables and system performance in meeting customer delivery requirements while maintaining low costs and high quality. Particular emphasis is placed on control policies that effectively accommodate the fluctuations and uncertainties in both product demand and component supply that are typically encountered in real manufacturing environments. Topics include inventory management, aggregate production planning, master production scheduling, material requirements planning, shop floor controls, and just-in-time systems. 3 units. *Staff*

471. Manufacturing Strategy. Explores the use of manufacturing as a competitive weapon. The course investigates various frameworks for describing, analyzing, and assessing the strategic operations choices available to companies, with the goal of determining how a company's operations can contribute to competitive success, organizational learning, and world-class status. Among the strategic decision categories that will be examined are process and technology choices, facilities and capacity decisions, quality and productivity management, and performance measurement. 3 units. *Staff*

472. Service Operations Management. Explores the role of operations in service organizations by examining in depth the nature, design, and delivery of services. This course considers the strategic, tactical, and operational issues associated with the management of a broad range of service operations, such as transportation companies, professional services, financial services, restaurants, and health-care services. 3 units. *Staff*

473. Management of Technology. Examines the multiple impacts that technology has on the firm. Major issues of technology management will be discussed, including innovation, competitiveness, technology assessment, R & D strategy, positioning, manu-

facturing technologies, and productivity. These issues are encountered not only in the technology-based company, but in any organization. Also covered will be the incorporation of a new technology into an existing industry and the new entrepreneur-based companies that are formed to work with a technology. The course will focus primarily on management issues, using as models new technologies such as biotechnology, superconductivity, microelectronics, and fiberoptics. 3 units. *Staff*

474. Managing Innovative Production Systems. Examines how managers evaluate and implement changes in the firm's process technology. The course looks at both soft technologies, such as information systems, just-in-time control, and group technology, and the hard technologies, such as NC machines, robotics, flexible manufacturing systems and computer integrated manufacturing. The course focuses on how to manage the changes in the structure of the firm, and how to use these systems to alter the competitive position of the firm. 3 units. *Staff*

482A. International Investment Finance. 3 units. *Staff*

482B. International Corporate Finance. 3 units. *Staff*

483. Strategy, Management, and Organization Design of Global Corporations. The course focuses on the management challenges associated with the development of strategies and the management of organizations in business enterprises whose operations stretch across national boundaries. The course emphasizes the way transnational corporations are different from purely domestic companies. The course addresses the choices and tradeoff involved in understanding the strategic and organizational challenges of managing transnational companies in a complex, increasingly interdependent, turbulent international environment. 3 units. *Staff*

490. Practicum. Topics vary each semester offered. 3 units. *Staff*

491, 1-9. Special Topics in Management. Permits the study of special topics in management on an occasional basis depending on the availability and interests of students and faculty. Examples of special topics include project management, legal, and tax aspects of entrepreneurship, real estate finance, labor negotiations and arbitration, and knowledge management. 3 units. *Staff*

499. Independent Study. Allows the student an opportunity to engage in a study of special topics on an individual basis under the supervision of a faculty member. Prerequisites: second-year standing in the Master of Business Administration program and consent of the Director of the M.B.A. Program and instructor. 3 units. *Staff*

Doctor of Philosophy

510. Bayesian Inference and Decision. Methods of Bayesian inference and statistical decision theory, with emphasis on the general approach of modeling inferential and decision-making problems as well as the development of specific procedures for certain classes of problems. Topics include subjective probability, Bayesian inference and prediction, natural-conjugate families of distributions, Bayesian analysis for various processes, Bayesian estimation and hypothesis testing, comparisons with classical methods, decision-making criteria, utility theory, value of information, and sequential decision making. C-L: Statistics 221. 3 units. *Winkler*

513. Choice Theory. This seminar deals with the topics of measurement theory, conjoint measurement, expected utility and subjective expected utility theory, multiattribute utility theory and recent advances in preference modeling (generalized nonlinear utility theories). The goal of this seminar is to equip students with tools so that they can use preference modeling in a wide variety of social science applications. C-L: Statistics 234. 3 units. *Staff*

521. Organization Seminar: A Micro Focus. Individual and small group behavior in organizations. Theories of motivation, decision making, interpersonal behavior, group processes, and leadership. A variety of research approaches and methods includes presentation of behavioral research by members of the Fuqua School of Business and other researchers. 3 units. *Staff*

522. Organization Seminar: A Macro Focus. The organization and the subunits which make up the organization. Theories of organization, structure, decentralization, divisionalization, functional area integration, task design, incentives and rewards, information systems, and decision rules are developed with an orientation toward their choice and design for high performance. Includes presentation of research by members of the Fuqua School of Business and other researchers. 3 units. *Staff*

525. Behavioral Decision Theory. Examines the development of research in individual and group decision behavior. Major emphasis is given to theoretical developments and empirical research, with a range of articles assigned for each topic. The basic topic areas include (1) decision problem structuring, (2) thinking about uncertainties, (3) risk taking, (4) dealing with conflicting values, and (5) combining individual judgments into a group decision. C-L: Psychology: Experimental 316, Psychology: Social and Health Sciences 316, and Statistics 231. 3 units. *Payne*

531. Financial Accounting Seminar. The nature of published financial statement information and its relationship with various economic variables. The list of related variables might include stock market data, bankruptcy filings, and the actions of various users of financial statement information, including management, investors, creditors, and regulators. The focus is on the current research methodologies and research efforts used to analyze the above relationships. A background in masters-level accounting and finance is assumed. 3 units. *Staff*

532. Management Accounting Seminar. Information systems and their use in facilitating management decision making and organizational control. Emphasis on the appropriate research methodologies and paradigms including information economics, decision theory, and organizational theory. Topics include budgeting, incentive systems/performance evaluation, variance investigation, and cost allocation. 3 units. *Staff*

551. Corporate Finance Seminar. Introduction to research areas in corporate finance. Emphasis on the research interests of the instructor, and one of the following topics to be explored in depth: capital budgeting, capital structure, mergers and acquisitions, international finance, and cash management. 3 units. *Staff*

552. Investment Seminar. Survey of research in the investment area and exploration in depth of one or more problems in which research is currently active. Emphasis determined by the instructor from one or more of the following areas: valuation of risky securities, capital asset pricing model and extensions, capital market efficiency, portfolio theory, options and warrants, investment management, and futures contracts. 3 units. *Staff*

553. Portfolio Theory and Asset Pricing. This course mathematically derives well-known results in portfolio theory and asset-pricing models in finance. Topics to be covered include: single-period mean-variance efficient portfolios and the CAPM; pareto optimal allocations; multiperiod and continuous-time optimal consumption and portfolio rules; intertemporal asset-pricing model; arbitrage pricing theory; the term structure of interest rates and inflation risk; allocational roles of futures and options; and pricing and hedging results. Basic mathematics background in calculus, statistics, matrix algebra, optimization and dynamic programming is required. 3 units. *Staff*

561. Seminar in Quantitative Research in Marketing. An overview of the quantitative techniques which are important in marketing research. Each model and technique will be examined in considerable detail so as to permit an understanding of its assumptions, structure, and usefulness. Topics covered will include the general data analysis techniques as well as models from advertising, new products, and pricing decisions. 3 units. *Staff*

562. Seminar in Consumer Behavior. Examines the development of research in consumer behavior. Major emphasis is given to theoretical developments and empirical research, with a range of articles assigned for each topic. Topics include motivation and personality, perceptual processes, information search, choice processes, attitudes and persuasion, learning, and influence in consumer choice. C-L: Psychology: Experimental 315 and Psychology: Social and Health Sciences 315. 3 units. *Bettman*

563. Marketing Models Seminar. The primary goals of this seminar are (a) to critically review the most current research in marketing and (b) to gain a better understanding of and ability to build one's own model. After taking this course, students should be able to understand the assumptions and mathematical development of the current quantitative work in marketing and to use this understanding to develop meaningful extensions. 3 units. *Staelin*

564. Experimental Design and Analysis Seminar. Examines issues in the design and analysis of experiments. Emphasis on analysis of variance (ANOVA), starting with the basic ANOVA model and examining multiple factor designs, blocking designs, nested models, within subject designs, repeated measure designs, and analysis of covariance. 3 units. *Edell*

571. Operations Strategy Seminar. Recent developments in the strategy of operations in both the manufacturing and service sectors. Topics include the focused factory concept, Japanese manufacturing philosophy, technological policy toward new process development and toward new product introduction, vertical integration, choice of capacity and location, industry analysis, and the impact of government regulation. Emphasis on the development of hypotheses about strategic topics and the empirical means by which they can be tested. 3 units. *Staff*

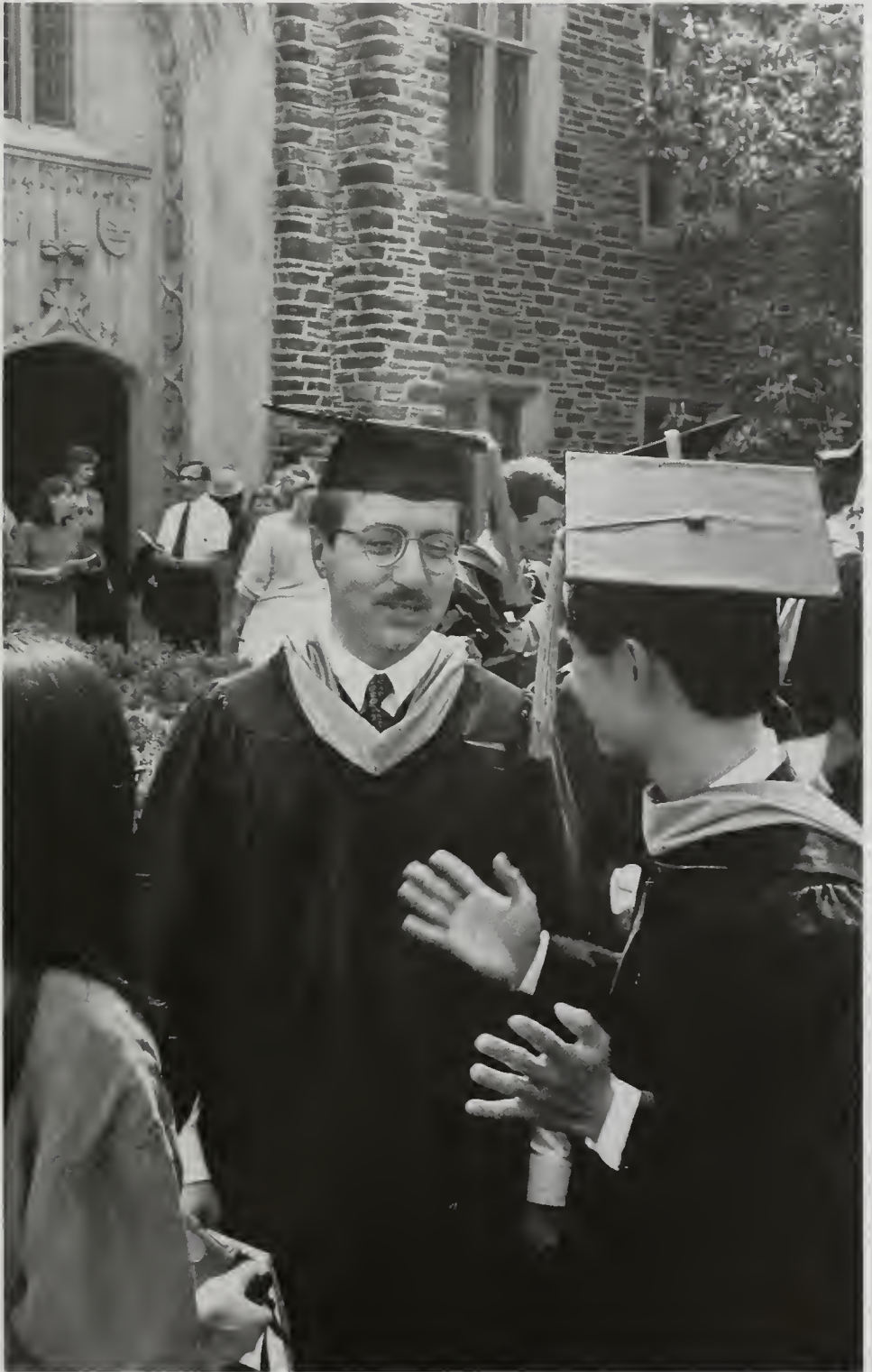
572. Seminar in Operational and Technological Tactics. Current issues in the day-to-day management of manufacturing and service delivery systems. Topics include material requirements planning, capacity requirements planning, quality of work life projects, productivity measurement and enhancement, implementation of new product introductions and production process modifications, quality assurance, production planning and scheduling, and logistics. Concentration on the substance of recent developments, the generation and test of hypotheses about tactical issues, and the applicability of various optimization techniques to the advance of operation tactics. 3 units. *Staff*

591. Selected Topics in Business. Allows the doctoral student the opportunity to study special topics in management on an occasional basis depending on the availability and interests of students and faculty. 3 units. *Staff*

597. Dissertation Research. For students actively pursuing research on their dissertation. Credit to be arranged. Prerequisites: student must have passed the preliminary examination and have the consent of the director of the doctoral program and instructor. Variable credit. *Staff*

598. Independent Study. Allows the doctoral student the opportunity to engage in study or tutorial on special topics on an individual basis under the supervision of a faculty member. Credit to be arranged. Prerequisites: doctoral program standing and consent of the director of the doctoral program and instructor. Variable credit. *Staff*

599. Directed Research. Allows the doctoral student to engage in individual research projects under the supervision of a faculty member. Credit to be arranged. Prerequisites: doctoral program standing and consent of the director of the doctoral program and instructor. Variable credit. *Staff*



Faculty



Faculty

The faculty of the Fuqua School of Business has developed a national reputation for both high quality teaching and research. One of the unique characteristics of this faculty is its diverse set of interests and professional backgrounds. Often an individual faculty member's interests will span two or three different areas of expertise. This diversity of interests ensures that the students will be exposed to wide-ranging views of the environment in which they will live and work after completing their educational experience.

The student-faculty ratio in the school is maintained at a level permitting development of close professional relationships and encouraging individual assistance in academic and professional relationships. Activities are planned which maximize student-faculty interaction. Some of these are career-related while others are more involved with research and teaching activities.

A brief description of the background and main areas of interest of the faculty follows:

Yair Aharoni, D.B.A., *J. Paul Sticht Visiting Professor of International Business*; B.A., M.A. (Tel Aviv University); D.B.A. (Harvard University).

Professor Aharoni is the Issachar Haimovic Professor (Emeritus) of Business Policy at Tel Aviv University. He has held appointments as visiting professor at Columbia, Stanford, Berkeley, and Boston University. He is the author of more than twenty books and monographs, more than seventy papers and book chapters, and over one hundred cases. His teaching and research interests lie in the areas of business policy and strategy, business and environment, international business, and comparative management. He serves on the editorial boards of *International Studies in Management*, and *Journal of International Business Studies*, and is an associate editor of *Management Science*, and *Organizational Science*, and is a Fellow of the Academy of International Business and the International Academy of Management.

James J. Anton, Ph.D., *Associate Professor of Business Administration*; B.S. (Emory University), Ph.D. (Stanford University).

Professor Anton is working on issues in technology adoption, procurement contracting, regulatory economics, and incentives. His teaching interests include microeconomics, macroeconomics, and industrial organization.

Alison H. Ashton, Ph.D., *Associate Professor of Business Administration*; B.S. (Louisiana State University), M.P.A., Ph.D. (The University of Texas at Austin).

Professor Ashton's academic interests are in behavioral decision theory and accounting. Her published research includes studies of auditors as decision makers, as well as managers as users of accounting information. She has taught behavioral decision theory and auditing at New York University, and has also taught at the University of Texas at Austin and the University of Alberta.

Robert H. Ashton, Ph.D., CPA, *T. Austin Finch, Sr. Professor of Business Administration, Area Coordinator for Accounting; and Director of the Accounting Research Center*; B.S. (Middle Tennessee State University), M.B.A. (Florida State University), Ph.D. (University of Minnesota).

Prior to joining the Duke faculty, Professor Ashton was on the faculties of New York University and the University of Texas at Austin, and he held a visiting position as the Winspear Foundation Professor at the University of Alberta. His principal research interests involve behavioral decision theory, especially as it relates to accounting and auditing issues. He also does research on the effectiveness and efficiency of external audits and other topics. He has published a book, a monograph, and numerous articles in leading journals. He serves as associate editor of *The Accounting Review* and on various other editorial boards.

Kostantinos Axaroglou, Ph.D., *Visiting Assistant Professor of Business Administration*; B.A. (University of Thessaloniki), M.A., Ph.D. (University of Michigan).

Professor Axaroglou's teaching interests are primarily in macroeconomics, industrial organization, and international finance. His research is in the areas of macroeconomics, industrial organization, and international finance. In addition, he studies the macroeconomic implications of production and inventory control strategies such as flexible manufacturing systems and just-in-time inventory control.

Helmy H. Baligh, Ph.D., *Professor of Business Administration*; B.A. (Oxford University), M.B.A., Ph.D. (University of California, Berkeley).

Professor Baligh joined the Duke faculty after teaching at the University of Illinois. His major research is in the analysis and design of economic structures for both business and social purposes. He has participated in the development of the Master of Business Administration programs at Duke and at the University of Illinois with emphasis on curriculum. His publications include *Vertical Market Structures* (with Leon E. Richartz) and several articles in the areas of transportation, hospital administration, marketing, economics, and organization structure design. He teaches in the fields of marketing, economic decision making, organization design, and the cultural setting of business.

Ravi Bansal, Ph.D., *Assistant Professor of Business Administration*; B.A., M.A. (University of Delhi), Ph.D. (Carnegie Mellon University).

Professor Bansal's interests are in financial economics, macroeconomics, and time series analysis. The focus of his research is constructing and testing theories of asset pricing. He teaches courses in macro and financial economics.

Messod Daniel Beneish, Ph.D., *Associate Professor of Business Administration*; B.Comm. (Ecole Supérieure de Commerce de Reims), M.B.A., Ph.D. (University of Chicago).

Professor Beneish's teaching interests are in the area of financial accounting with a particular emphasis on the analysis of financial statements. His research investigates incentives, regulation, and capital markets. His current work focuses on agency problems between borrowers and lenders and studies the economic consequences of debt restructurings, covenant violations, and lender liability.

James R. Bettman, Ph.D., *Burlington Industries Professor of Business Administration, Director of the Ph.D. Program*; B.A., M.Phil., Ph.D. (Yale University).

Prior to joining the Fuqua School of Business, Professor Bettman taught at the Graduate School of Management, University of California, Los Angeles. He is the author of *An Information Processing Theory of Consumer Choice* and *The Adaptive Decision Maker* as well as numerous articles in academic journals. Professor Bettman has served as a consultant to government agencies, as a member of editorial boards of scholarly publications, as a participant in numerous forums, and as coeditor of the *Journal of Consumer Research*. His teaching interests are in consumer behavior and quantitative methods; his current research focuses on adaptive decision making and consumer behavior.

Utpal Bhattacharya, Ph.D., *Visiting Assistant Professor of Business Administration*; B.Tech. (IIT-Kanpur), M.B.A. (IIM-Ahmedabad), Ph.D. (Columbia University).

Professor Bhattacharya teaches introductory finance and investments. His major research interests lie in the analysis of strategic behavior in imperfect markets. His prior research has focused on how severe asymmetric information collapses trade in security

markets. Currently, he is examining a data base that contains all the 15,188 trading suspensions that occurred in the NYSE from 1974 to 1988.

Preston C. Bottger, Ph.D., *Associate Professor of the Practice of Management*; B.E. (Hons), M.E., Ph.D. (University of New South Wales).

Professor Bottger is director of the Center for Mid-Size Company Education and Research. He specializes in helping individuals and companies develop the capacities for strategy formulation and implementation. He is formerly of the Australian Graduate School of Management, University of New South Wales. There he was founding director of the Graduate Management Qualification, an M.B.A. course for engineers and scientists. He is the lead author of *Managing People* and has published many scientific articles on decision making, leadership, and motivation. Professor Bottger is on the editorial board of *Asia Pacific HRM*.

William F. Boulding, Ph.D., *Associate Professor of Business Administration*; B.A. (Swarthmore College), Ph.D. (University of Pennsylvania).

Professor Boulding is interested in model building relevant to managerial decision making. His current work focuses on the efficiency of various strategic options available to the firm. His teaching interests lie in the areas of marketing strategy and marketing management.

Karla E. Bourland, Ph.D., *Visiting Assistant Professor of Business Administration*; B.B.A. (Eastern Michigan University), M.S., Ph.D. (University of Michigan).

Professor Bourland spent five years on Ford Motor Company's Corporate Engineering and Manufacturing Staff before joining the faculty at the Amos Tuck School at Dartmouth College. Her research interests, which are largely driven by her experiences at Ford, include intra- and inter-plant coordination, alternative buffering strategies (including buffer stocks, buffer times, and buffer capacity), finite capacity scheduling, and the use of electronic data interchange to improve production and inventory control performance.

Douglas T. Breeden, Ph.D., *Research Professor of Finance*; S.B. (M.I.T.), M.A., Ph.D. (Stanford University).

Prior to joining the Fuqua School of Business faculty, Professor Breeden taught at Stanford University, the University of Chicago, and M.I.T. Professor Breeden's teaching and research interests are in the area of banking, investments, futures, and options. He has published in the major finance journals and is associate editor of the *Journal of Finance*, and editor of the *Journal of Fixed Income*.

Richard M. Burton, D.B.A., *Professor of Business Administration*; B.S., M.B.A., D.B.A. (University of Illinois).

Professor Burton's primary research interests are in the strategy, design, and management of organizations. He is currently developing the application of expert systems to organizational design. He teaches courses in organization design and management of professional service organizations. He is the program director for the Health Services Management Program and a departmental editor for *Management Science*.

Ziv Carmon, Ph.D., *Assistant Professor of Business Administration*; B.Sc. (Technion, Israel Institute of Technology), M.S., Ph.D. (University of California at Berkeley).

Professor Carmon's research focuses on consumer decision making, on sales promotions, and on consumers' perceptions of the quality of products and services. He teaches the marketing management course.

Peter P. Carr, Ph.D., *Visiting Assistant Professor of Business Administration*; B.Comm., M.B.A. (The University of Toronto), Ph.D. (University of California at Los Angeles).

Professor Carr is an assistant professor of finance at Cornell University's Johnson Graduate School of Management. His research interests include derivative securities, fixed income valuation, and portfolio management. He is currently interested in exotic options, and in the use of computers in the classroom. He consults with several firms on derivative security valuation and hedging.

Robert L. Clark, Ph.D., *Visiting Professor of Business Administration*; B.A. (Millsaps College), M.A., Ph.D. (Duke University).

Professor Clark, who is teaching managerial economics at Fuqua, is professor of economics and business management, College of Management, North Carolina State University. He has published widely in the areas of retirement policies, compensation and benefits, labor

economics, and economics of individual and population aging. Recent research has examined labor market responses to population aging in Japan, international pensions, retiree health insurance, and international retirement policies.

Kalman J. Cohen, Ph.D., *Distinguished Bank Research Professor (Emeritus)*; B.A. (Reed College), M.Litt. (Oxford University), M.S., Ph.D. (Carnegie Mellon University).

Prior to joining the Duke faculty, Professor Cohen served for two years as Distinguished Professor of Finance and Economics and as the first director of the Salomon Brothers Center for the Study of Financial Institutions at New York University. He also spent fourteen years on the faculty of Carnegie Mellon University's Graduate School of Industrial Administration. He has written seven books and over eighty articles in the areas of banking and finance, strategic planning, economics, management science, and computer simulation. He has pioneered in the applications of management science techniques in banking. His current research focuses on the microstructure of security markets.

Francisco Delgado, Ph.D., *Assistant Professor of Business Administration*; B.S., (Catholic University, Lima), M.B.A., (Northern Illinois University), M.A., Ph.D., (University of Pennsylvania).

Professor Delgado's research involves international exchange rate and pricing problems, especially continuous time stochastic models and rational economic decisions in the presence of adjustment costs. He is currently working on transactions cost in financial markets. He teaches international finance, financial management, and futures and options.

Daniel Deneffe, Ph.D., *Visiting Assistant Professor of Business Administration*; Candidacy in Law Degree (Katholieke Universiteit Leuven), B.A. (University of Toronto); M.A., Ph.D. (Cornell University).

Professor Deneffe's teaching interests are primarily in the areas of managerial economics and business strategy. His current research is in industrial organization/corporate strategy and applies tools of microeconomic analysis to the study of issues central to strategic management, such as strategic diversification. He is also involved in applied econometric research in health economics which focuses on the pricing behavior of hospitals in various market structural and institutional environments.

Mark D. Dibner, Ph.D., *Adjunct Associate Professor of Business Administration*; B.A. (University of Pennsylvania), M.B.A. (Widener College), Ph.D. (Cornell University).

Professor Dibner received his B.A. in psychology and physiology, his M.B.A. in strategic planning, and his Ph.D. in neurobiology and behavior. He is currently on the staff of the North Carolina Biotechnology Center and was formerly employed by E.I. du Pont de Nemours & Co. in neurobiology research. His primary research interest is the biotechnology industry, and he teaches in the area of management of technology. He has written or edited six books on the U.S. and Japanese biotechnology industry, serves on four editorial boards, and is on the Board of Directors of the Association of Biotechnology Companies, the Council of Biotechnology Centers, and ESE Biosciences, Inc.

Bernard Dumas, Ph.D., *Research Professor of Business Administration*; B. Engineering (Ecole Centrale de Paris), M.S., Ph.D. (Columbia University).

Professor Dumas is also a professor of finance at the H.E.C. School of Management in France. Prior to joining the Fuqua School of Business faculty as research professor, he served as professor of finance at the Wharton School of the University of Pennsylvania. He has also been a visiting professor at Columbia University and at the University of California at Berkeley. He has published in the area of international finance. Professor Dumas has been an associate editor of *Journal of International Business Studies* and *Journal of Banking and Finance* and is currently an associate editor of *European Economic Review*.

Julie A. Edell, Ph.D., *Associate Professor of Business Administration*; B.A. (University of Nebraska), M.S., Ph.D. (Carnegie Mellon University).

Professor Edell's teaching interests are in the area of marketing, with emphasis on advertising, marketing management, consumer behavior, and marketing research. Her current research is concerned with examining the effect of advertising communications upon consumer purchase behavior. Her work has appeared in the *Journal of Consumer Research* and *Journal of Marketing Research*.

Gregory W. Fischer, Ph.D., *Professor of Business Administration*; B.A., M.A., Ph.D. (University of Michigan).

Professor Fischer's research focuses on individual judgment and decision making and cognitive aspects of social behavior. His teaching interests are in managerial decision making, decision analysis, and managerial effectiveness. He is currently coeditor of the *Decision Analysis Department of Management Science*.

John D. Forsyth, D.B.A., *Professor of Business Administration*; B.A. (Queen's University), M.B.A. (University of Detroit), D.B.A. (University of Illinois).

Prior to coming to Duke, Professor Forsyth was professor of business administration and director of the Program for Executive Development at IMEDE Management Development Institute in Lausanne, Switzerland. His teaching and research interests are in the areas of corporate finance and corporate strategy.

F. Douglas Foster, Ph.D., *Associate Professor of Business Administration*; B. Comm. (The University of Alberta), M.S., Ph.D. (Cornell University).

Professor Foster is interested in financial intermediation, capital market theory, and international finance. His current research is in investment banking, the microfoundations of trading and corporate control. He teaches investment banking and international finance.

Eric J. Friedman, Ph.D., *Assistant Professor of Business Administration*; A.B. (Princeton University), M.A., M.S., Ph.D. (University of California at Berkeley).

Professor Friedman's teaching interests lie in the areas of statistics and management science. His research focuses on the application of game theory to problems in decentralized decision making and dynamic processes.

Katsumi Fujitani, L.L.M., *Adjunct Assistant Professor of Business Administration*; L.L.B. (Meiji University), L.L.M. (Meiji University School of Law).

Professor Fujitani teaches in the area of Japanese and Japanese business culture. His teaching and research interests include international manufacturing and operations management in comparative sociology. Prior to coming to Duke, Professor Fujitani was on the faculty of Appalachian State University and worked for Ricoh in the international operation of legal and patent affairs. He is also teaching current topics in Japan at Duke's Trinity College.

Anil Gaba, Ph.D., *Visiting Associate Professor of Business Administration*; B.A. (St. Stephen's College, Delhi University), Ph.D. (Duke University).

Anil Gaba is associate professor of Decision Sciences at INSEAD, Fontainebleau, France. He teaches courses in applied statistics, decision analysis, and Bayesian analysis. His research interests are in decision theory, Bayesian statistics, and forecasting.

John P. Gallagher, Ph.D., *Associate Professor of the Practice of Business Computing*; B.A. (University of California, Berkeley), Ph.D. (University of California, Santa Barbara).

Professor Gallagher has extensive teaching experience in computer applications to education and problem solving. His research and teaching interests lie in the areas of computer application in support of managerial decision making, artificial intelligence and expert systems applications in management, and instructional psychology.

Campbell R. Harvey, Ph.D., *Associate Professor of Business Administration*; B.A. (University of Toronto), M.B.A. (York University, Toronto), Ph.D. (University of Chicago).

Professor Harvey's primary area of research is investments. His work focuses on asset pricing models that allow for expected returns and risks to change through time. His research investigates the link between the business cycle and changing risk. He has published in the *Journal of Political Economy*, *Journal of Finance*, *Review of Financial Studies*, and the *Journal of Financial Economics*. He teaches courses in financial management and investment analysis.

Heather A. Haveman, Ph.D., *Associate Professor of Business Administration*; B.A., M.B.A. (University of Toronto), Ph.D. (University of California, Berkeley).

Professor Haveman's research concerns the causes and consequences of changing organizational structure and strategy. She is investigating the transformation of the savings and loan industry after deregulation and has published papers in *Administrative Science*

Quarterly and Organizational Science. Professor Havemen teaches courses in organizational behavior, the management of technology and innovation, and entrepreneurship.

David A. Hsieh, Ph.D., *Professor of Business Administration and Area Coordinator for Economics*; B.S. (Yale University), Ph.D. (Massachusetts Institute of Technology).

Prior to joining the Fuqua School of Business, Professor Hsieh taught at the Graduate School of Business, University of Chicago for eight years. His primary area of research is nonlinear dynamics in economics and finance, with a particular emphasis on empirical applications in foreign exchange rates. He teaches international finance, international environments, and money and capital markets.

Joe I. C. Huber, Ph.D., *Professor of Business Administration*; B.A. (Princeton University), M.B.A., Ph.D. (University of Pennsylvania).

Professor Huber came to the Fuqua School from the Columbia University School of Business and the Krannert Graduate School of Management, Purdue University. His teaching interests include industrial marketing, product marketing, and corporate strategy. His current research has focused on the use of computer-based interviewing to assess consumer reactions to promotions, price differences, and external quality ratings.

Simon Johnson, Ph.D., *Assistant Professor of Business Administration*, B.A. (University of Oxford); M.A. (University of Manchester), Ph.D. (Massachusetts Institute of Technology).

Professor Johnson studies economic reform in Eastern Europe and the former Soviet Union. Before coming to Duke, he was a junior scholar at the Academy for International and Area Studies and a fellow at the Russian Research Center at Harvard University. Professor Johnson teaches courses in economics and international business.

Toby Y. Kahr, Ph.D., *Adjunct Associate Professor of Business Administration*; B.S. (Columbia University), M.A., Ph.D. (University of Illinois).

Professor Kahr is associate vice-president and director of Duke University Human Resources. Before coming to Duke he served as director of personnel services at the University of Illinois and worked for Ford Motor Company in personnel administration. Professor Kahr teaches courses in human resources management and industrial relations.

Thomas F. Keller, Ph.D., CPA, *R. J. Reynolds Professor of Business Administration and Dean*; A.B. (Duke University), M.B.A., Ph.D. (University of Michigan).

Professor Keller specializes in accounting. His current research and teaching interests are principally in the areas of financial accounting and reporting. He has held several offices in the American Accounting Association, including editor of the *Accounting Review* (1972-75). He is the coauthor and coeditor of several books in financial accounting. During the summer and fall of 1975, under the auspices of a Fulbright grant, he lectured in Australia and the Far East on a variety of topics related to the development of accounting theory and standards. He is currently a director of the American Assembly of Collegiate Schools of Business, American Business Products, Inc., Cambridge Series Trust, Hatteras Income Securities, Inc., LADD Furniture, Inc., Mebane Packaging Co., Mentor Growth Trust, Monk-Austin, Inc., Nations Funds, Inc., Wendy's International, Inc., and is chairman of the RTP World Trade Center. He has served as dean of the School of Business since 1974.

Panagiotis (Panos) Kouvelis, Ph.D., *Associate Professor of Business Administration*, B.S.M.E. (National Technical University of Athens), M.B.A., M.I.S.E. (University of Southern California), Ph.D. (Stanford University).

Professor Kouvelis is studying a broad range of problems including design and planning issues of flexible manufacturing systems and electronic assembly line, layout design, cyclic scheduling, product design and its interface with operations management decisions, and strategic aspects of quality management. Prior to moving to the Fuqua School of Business he was on the faculty of the management department at the University of Texas. Professor Kouvelis teaches courses in operations management, manufacturing strategy, and international operations management.

Albert (Pete) Kyle, Ph.D., *Associate Professor of Business Administration*; B.S. (Davidson College), B.A. (Merton College, Oxford University), Ph.D. (University of Chicago).

Professor Kyle teaches courses in corporate finance and information economics. Before coming to the Fuqua School, he taught at the University of California at Berkeley and the Woodrow Wilson School, Princeton University. His research interests are in the area of information economics with emphasis on the trading process and price information.

Dan J. Laughhunn, D.B.A., *Professor of Business Administration*; B.S., M.B.A., D.B.A. (University of Illinois).

Professor Laughhunn has served as a consultant to industry and universities on a variety of topics related to planning and budgeting. His teaching and research interests deal with the application of quantitative techniques to problems in production and finance. Professor Laughhunn also has been actively engaged in teaching executive development programs, both at Duke and at other universities.

Arie Y. Lewin, Ph.D., *Professor of Business Administration*; B.S., M.S. (University of California, Los Angeles), M.S., Ph.D. (Carnegie Mellon University).

Professor Lewin's overall research interests involve the analysis of organizational effectiveness and the design of organizations. His current research involves the organization, design, and management of continuously improving learning organizations, the development and application of the data envelopment analysis methodology for evaluating organization effectiveness, and the implications of computer mediated communication technology for organizational decision making and design. He has served as director of the Decision, Risk, and Management Science Program and NSF and is founding editor-in-chief of *Organization Science*.

Patricia W. Linville, Ph.D., *Associate Professor of Business Administration*, B.A. (Florida Southern College), Ed.M. (Harvard University), Ph.D. (Duke University).

Prior to coming to Duke, Professor Linville was a postdoctoral fellow in social cognition at Carnegie Mellon University, then for nine years was a faculty member in the Department of Psychology at Yale University. Her research area is social cognition, focusing on cognitive representations of knowledge and their consequences for social inference, judgment and decision making, health risk perception, stress and coping, and stereotyping and intergroup relations. She is on the editorial board of *Journal of Personality and Social Psychology*.

John M. McCann, Ph.D., *Professor of Business Administration*; B.S.M.E., M.B.A. (University of Kentucky), Ph.D. (Purdue University).

Professor McCann served on the faculty of the Graduate School of Business and Public Administration at Cornell and has been a consultant with an economic modeling and research firm. He is director of the Marketing Workbench Laboratory at the Fuqua School. His teaching interests are in the areas of marketing, econometrics and information systems. His current research involves the methods for automating the process of generating insights from market data.

Kevin F. McCardle, Ph.D., *Associate Professor of Business Administration*; B.S. (Marquette University), M.A., Ph.D. (University of California, Los Angeles).

Professor McCardle's teaching interests lie in the area of probability and statistics, quality control, and total quality management. His research involves sequential decision theory, game theory and its applications, and models of R&D.

J. Alexander McMahan, *Executive in Residence*; B.A. (Duke University), J.D. (Harvard University).

Before joining the Fuqua faculty, Mr. McMahan was chairman of the Department of Health Administration in the Duke Medical Center. He conducts two seminars in the Health Services Management Program, and advises students interested in careers in health services organizations. He was formerly chairman of the Board of Trustees of Duke University, president of the American Hospital Association, president of Blue Cross and Blue Shield of North Carolina, and professor of Public Law and Government at the University of North Carolina, Chapel Hill.

Wesley A. Magat, Ph.D., *Professor of Business Administration, Senior Associate Dean for Academic Programs, and Director of the Center for the Study of Business, Regulation, and Economic Policy*; A.B. (Brown University), M.S., Ph.D. (Northwestern University).

Professor Magat teaches primarily in the fields of managerial economics and regulatory management. He is currently involved in research in the areas of environmental, risk, and information regulation. He is the author or coauthor of five books, and his papers have appeared in numerous academic journals.

Laureen A. Maines, Ph.D., *Associate Professor of Business Administration*; B.S., M.B.A. (Indiana University) M.B.A., Ph.D. (University of Chicago).

Professor Maines' research interests focus on the use of accounting information for decision making purposes. Her current research examines various aspects of consensus forecasts of accounting variables. Her teaching interests include both managerial and financial accounting. Professor Maines has taught accounting at Indiana University and the University of Chicago and was a small business consultant with Deloitte Haskins & Sells.

Joseph B. Mazzola, Ph.D., *Associate Professor of Business Administration and Area Coordinator for Operations Management*; B.S. (State University of New York at Stony Brook); M.A. (Wake Forest University); M.S., Ph.D. (Carnegie Mellon University).

Professor Mazzola's teaching and research interests are in the areas of production/operations management, management science, and operations research. His current research involves topics arising in automated manufacturing, operations scheduling, production and inventory control, and mathematical programming. Prior to coming to Duke, Professor Mazzola served on the faculty of the University of North Carolina at Chapel Hill.

Marian Chapman Moore, Ph.D., *Associate Professor of Business Administration*; B.A. (College of William and Mary), M.S. (Virginia Commonwealth University), Ph.D. (University of California, Los Angeles).

Professor Moore's teaching interests include marketing strategy and planning, competitive analysis, and product management. Her current research activities are focused on understanding how managers learn about their competitors and factor that information into their own decision making, and on issues of advertising effectiveness.

Michael J. Moore, Ph.D., *Associate Professor of Business Administration*; B.S. (Boston College), M.B.A. (Babson College), M.S., Ph.D. (University of Michigan).

Professor Moore's research interests are primarily in the areas of health and safety regulation. He has published articles on workers' compensation insurance, environmental policy, occupational safety, alcohol control policy, and health policy in various economic journals. His first book, *Compensation Mechanisms for Job Risks: Wages, Workers' Compensation, and Product Liability*, was published in 1990. He is currently studying the effects of product liability risk on innovation decisions, product safety regulation, and alcohol abuse. His teaching interests are in applied microeconomics, and econometrics.

Jayaram Muthuswamy, Ph.D., *Assistant Professor of Business Administration*, B. Sc., (London School of Economics), M.B.A., (University of Pennsylvania), M.S., (Stanford University), Ph.D., (University of Chicago).

Professor Muthuswamy's research interests are in the areas of nonlinear structures for asset returns, theory of stochastic processes, and market micro-structure issues. He teaches investment management and the core finance course. Professor Muthuswamy has worked for the Development Bank of Singapore and Marine Midland Bank.

Purushottaman Nandakumar, Ph.D., *Assistant Professor of Business Administration*; B.Tech. (Indian Institute of Technology); M.B.A. (Indian Institute of Management); M.S., Ph.D. (Carnegie Mellon University).

Professors Nandakumar's research interests are in operations management. His current research portfolio includes projects in the areas of inventory management and process improvements in manufacturing systems. Professor Nandakumar teaches the core operations management course and an elective in productivity improvement and process learning.

Robert F. Nau, Ph.D., *Associate Professor of Business Administration and Area Coordinator for Decision Sciences*; B.A. (University of California at San Diego), M.S., Ph.D. (University of California at Berkeley).

Professor Nau's research interests include the mathematical foundations of decision theory and game theory and their applications in economics and finance. Prior to coming to the Fuqua School, Professor Nau taught at Tulane University and served as manager of information systems at Liberty Mutual Insurance Company. He has taught courses in management science, computers and information systems, and statistical forecasting.

Pierre C. Ndilikilikisha, Ph.D., *Assistant Professor of Business Administration*; B.S., M.S. (Odessa State University), Ph.D. (University of Kansas).

Professor Ndilikilikisha's research interests lie at the interface between management science, decision analysis, and artificial intelligence. He is currently working on influence diagrams and their applications in expert systems design. His teaching interests include management science, decision analysis, and expert systems.

Gwen Ortmeyer, Ph.D., *Associate Professor of the Practice of Business Administration*, B.S. (University of California at Berkeley), Ph.D. (Stanford University).

Professor Ortmeyer's teaching interests include marketing strategy and planning, competitive analysis, and retailing. Prior to coming to the Fuqua School, she taught at Columbia's Graduate School of Business and the Harvard Business School. She is active in executive education and consulting to a variety of organizations. Professor Ortmeyer's research activities focus on retailing issues such as channel partnerships and retail pricing strategy.

John W. Payne, Ph.D., *Joseph J. Ruvane, Jr. Professor of Business Administration, Area Coordinator for Management and Director of the Center for Decision Studies*; B.A., M.A., Ph.D. (University of California, Irvine).

Prior to coming to Duke, Professor Payne was on the faculty of the Graduate School of Business at the University of Chicago. His primary research activities deal with individual decision behavior. He has investigated decision making under risk, consumer choice behavior, and the design of computer-based support systems. He teaches courses in decision theory, organizational behavior, and consumer behavior.

David W. Peterson, Ph.D., *Adjunct Professor of Business Administration*; B.S.E.E. (University of Wisconsin-Madison); M.S., Ph.D. (Stanford University).

For many years a full-time professor in the Fuqua School, Professor Peterson has also taught statistics at Duke in the Health Administration Program, Law School, Mathematics Department, the School of the Environment, and the Institute for Statistics and Decision Sciences. His general areas of interest are in mathematical modelling and computing, with special emphasis on the use of such techniques in civil and criminal litigation, and he is the president of PRI Associates.

Robert M. Price, Executive in Residence; B.S. (Duke University), M.S. (Georgia Institute of Technology).

Mr. Price is retired chairman of the board and chief executive officer of Control Data Corporation, Minneapolis, Minnesota, where he continues to serve as a consultant. Currently, Mr. Price is involved in quality, U.S. technology policy, and educational issues. He is on the boards of directors of International Multifoods, Rohr Industries, Premark International, and Public Services Company of New Mexico, and is a fellow of the International Academy of Management, and a member of the Board of the Center of International Leadership. He is on the advisory board of the technology task force for the Committee on Science, Space, and Technology, and co-chair of the technology committee for the Congressional Economic Leadership Institute.

Devavrat Purohit, Ph.D., *Associate Professor of Business Administration*; B.A. (Muskingum College), M.B.A., Ph.D. (Carnegie Mellon University).

Professor Purohit's teaching interests are marketing management, product and pricing management, and marketing research. His research interests are new product development and obsolescence, pricing, consumer perceptions of product changes, and trade-in and rebate policies.

Robert E. Reinheimer, Ph.D., Professor of the Practice of Management Communication; B.A., M.A. (California State University, Fullerton), Ph.D. (University of Kansas).

Professor Reinheimer came to the Fuqua School from the University of Virginia. His primary areas of interest are negotiation, persuasion strategy, task group effectiveness, and communication. He has taught a number of courses and executive development programs in these areas, and is responsible for the management communication courses in the M.B.A. and Executive M.B.A. programs.

Mark C. Rogers, *Adjunct Professor of Business Administration*; B.A. (Columbia University), M.D. (State University of New York), M.B.A. (University of Pennsylvania).

Dr. Rogers is vice-chancellor for Health Systems of Duke University Medical Center and executive director of Duke Hospital. Prior to coming to Duke, he was at The Johns Hopkins Hospital, where he was director of the Pediatric Intensive Care Unit, professor of pediatrics, Distinguished Faculty Professor, and chairman of the Department of Anesthesiology and Critical Care Medicine, as well as associate dean for Clinical Practice. His teaching interests at the Fuqua School involve strategic management for health services.

Jeffrey L. Rummel, Ph.D., *Associate Professor of Business Administration*; B.A. (Capital University), M.S., Ph.D. (University of Rochester).

Professor Rummel's teaching and research interests are in the areas of manufacturing and operations management, management science, and mathematical programming. He has published in *Management Science* and the *Journal of Manufacturing and Operations Management*. Current research projects include work on cost and performance measurement in batch manufacturing, automated scheduling systems, and lot sizing and release planning for manufacturing.

J. Edward Russo, Ph.D., *Visiting Professor of Business Administration*; B.S. (California Institute of Technology), M.S. (University of Michigan), Ph.D. (University of Michigan).

Professor Russo is visiting from Cornell University. His teaching interests encompass consumer behavior, marketing management, decision making, and organizational behavior. His research interests center on decision making, especially cognitive processes, decision aiding, and consumer decisions.

Jane E. Salk, Ph.D., *Assistant Professor of Business Administration*; B.A. (University of Chicago), M.A. (University of North Carolina), Ph.D. (Massachusetts Institute of Technology).

Professor Salk's current research encompasses the sociological and group development aspects of international shared management joint venture teams. She has also done work on mergers and acquisitions and has done clinical research in West German businesses. In 1989-90 she was a Fulbright Scholar at the University of Cologne and has also received recognition and support by Marketing Science Institute and as a Kenan Fellow.

William A. Sax, *Executive in Residence*; B.S. (St. Louis University).

Mr. Sax teaches strategic business planning for midsize business and consulting for small business. He worked for thirty-six years in the oil industry, the last thirty-one years with Unocal Corporation (formerly Union Oil Company of California) where he was vice-president of international oil and gas exploration.

James E. Sheldon, L.L.M. *Adjunct Assistant Professor of Business Administration*; B.A. (Dartmouth College), J.D. (University of California), L.L.M. (Boston University Law School), L.L.M. (University of Stockholm).

Before joining the Fuqua School of Business, Mr. Sheldon practiced corporate, securities, and tax law for seven years in Boston and San Francisco. His teaching and research interests include business and tax planning. He is a principal of the Synertech Group, a new venture development firm, and is a member of the California, Massachusetts, and North Carolina Bar Associations.

Blair H. Sheppard, Ph.D., *Professor of Business Administration and Associate Dean for Executive Education*; B.A., M.A. (University of Western Ontario), Ph.D. (University of Illinois).

Professor Sheppard teaches in the area of organizational behavior. His interests generally relate to the broad topic of managing relationships with organizations. Specific research interests

include conflict management, motivation, justice, negotiation, group performance, and employee attitudes. He has published articles on all of these topics in a range of business and psychology journals and is coeditor of an annual series entitled "Research on Negotiation in Organizations." His professional activities include executive education and consulting for a variety of organizations and active participation in professional associations.

Charles J. Skender, M.B.A., CPA, *Visiting Assistant Professor of Business Administration*; B.S. (Lehigh University), M.B.A. (Duke University).

Professor Skender has attained nine professional designations in accounting, insurance, and financial management. He has served as a training consultant for Wells Fargo Bank, and previously worked on the audit staff of Deloitte Haskins & Sells. In 1985 he received an outstanding teacher award at North Carolina State University, where he is a member of the Golden Chain. Professor Skender has published in *TAXES*. He teaches courses in managerial and financial accounting.

Frank A. Sloan, Ph.D., *J. Alexander McMahon Professor of Health Policy and Management*; B.A. (Oberlin College), Ph.D. (Harvard University).

Prior to coming to Duke, Professor Sloan was a member of the faculty of the economics department at Vanderbilt University. His primary research interest is health economics. He has studied many facets of medical malpractice, hospitals, physicians' services, families' decisions about long-term care, and pharmaceuticals. Recently he has written several papers on drinking and driving.

Paula R. Sloan, *Adjunct Associate Professor*, B.A. (City University of New York), M.A.T. (Harvard University), M.S. (University of California at Los Angeles).

Professor Sloan is known for her development of programs to help adults overcome math anxiety, and for her development of academic support programs for mid-career business people returning to academe. Prior to coming to Duke, she served on the faculty of The Owen Graduate School of Management at Vanderbilt University.

James E. Smith, Ph.D., *Assistant Professor of Business Administration*; B.S., M.S., Ph.D. (Stanford University).

Professor Smith's research interests are primarily in the area of probabilistic modeling and decision analysis, focusing on approximate techniques used in decision analysis and computer tools for aiding and/or automating decision analysis. At Fuqua, Professor Smith teaches courses in statistics and decision analysis.

Thomas M. Smith, Ph.D., *Associate Professor of Business Administration*; B.Comm., M.F.M. (University of Queensland), Ph.D. (Stanford University).

Professor Smith teaches courses in financial management, asset pricing, and empirical methodology in finance. Before coming to the Fuqua School he taught at the University of Queensland and Brisbane College of Advanced Education in Australia. His research interests are asset pricing theory and tests.

Harris Sondak, Ph.D., *Assistant Professor of Business Administration*; B.A. (University of Colorado); M.S., Ph.D. (Northwestern University).

Professor Sondak teaches negotiations and business ethics courses. His research investigates allocation procedures and decisions in various contexts including two-party and multi-party negotiations. His research has been published in *Negotiation Journal*, *Group Decision and Negotiation*, *Organizational Behavior and Human Decision Processes*, and *Research on Negotiation in Organizations*.

Richard Staelin, Ph.D., *Edward and Rose Donnell Professor of Business Administration and Area Coordinator for Marketing*; B.S., M.B.A., Ph.D. (University of Michigan).

Prior to joining Duke's faculty, Professor Staelin served as professor and associate dean at the Graduate School of Industrial Administration, Carnegie Mellon University. He was also a visiting professor at the Australian Graduate School of Management and at the University of Chicago. His professional activities include consulting work for both the public and private sectors, executive director of Marketing Science Institute, and publication of a book and over fifty journal articles. He was Fuqua's associate dean for faculty for eight years. Professor Staelin's

current research interests include information search, channel management, and strategy formulation.

Deborah L. Swenson, Ph.D., *Visiting Assistant Professor of Business Administration*; B.A. (Stanford University), Ph.D. (Massachusetts Institute of Technology).

Professor Swenson's research is in foreign direct investment in the U.S. She also has interests in fiscal economics, industrial organization, and econometrics. Swenson is currently evaluating the effects of cross-country variation in tax codes. She teaches macroeconomics and international business.

James H. Vander Weide, Ph.D., *Research Professor of Business Administration*; B.S. (Cornell University), Ph.D. (Northwestern University).

Professor Vander Weide's primary research and teaching interests are in the areas of corporate finance and managerial economics. He has written papers on topics such as cash management, capital budgeting, portfolio analysis, and the economic effects of government regulation. He has also served as a consultant to banks in the area of cash management. He has testified as an expert witness on the cost of capital before the Public Utility Commission of several states.

S. Viswanathan, Ph.D., *Associate Professor of Business Administration*; B.S., M.M.S. (University of Bombay), Ph.D. (Northwestern University).

Professor Viswanathan teaches corporate finance. His major research interests are corporate finance, market microstructure, and nonlinear asset pricing. His prior research has focused on the relationship between volume and volatility on the stock exchange and has been published in the *Journal of Business*, *Journal of Finance* and *Review of Financial Studies*. Currently, he is working on a study of foreign stock exchanges.

Wanda T. Wallace, Ph.D., *Assistant Professor of Business Administration*; B.A., M.A.T., Ph.D. (Duke University).

Professor Wallace's general research interests involve consumer memory of advertising and products. Specifically, she is examining the effect of music on consumer memory for an advertisement and on emotional reaction to an advertisement. Her teaching interests include marketing management, consumer behavior, and marketing of services.

Robert E. Whaley, Ph.D., *T. Austin Finch Foundation Professor of Business Administration, Director of the Futures and Options Research Center, and Area Coordinator for Finances*; B. Comm. (University of Alberta), M.B.A., Ph.D. (University of Toronto).

Prior to joining the Fuqua School of Business faculty, Professor Whaley taught at Vanderbilt University, the University of Alberta, and the University of Chicago. He also served as vice president for research with GNP Consulting in Chicago and as director of the Institute for Financial Research at the University of Alberta. Professor Whaley's research interests are currently in the area of market volatility, financial futures and options, and market microstructure. He has published numerous articles in finance, business, and accounting journals, has published six books, including a textbook on the theory and applications of futures and option contracts, is coeditor of the *Review of Futures Markets*, and is associate editor for *Advances in Futures and Options Research*, *Journal of Financial Economics*, and *Journal of Finance*.

Andrew B. Widmark, J.D., *Professor of the Practice of Real Estate*; B.S. (Fairleigh Dickinson University), M.B.A. (University of Pennsylvania), J.D. (Rutgers University).

Mr. Widmark teaches a course in fundamentals of real estate and a course in urban revitalization. He is president of Mark Realty Corp. which owns and manages shopping centers and office buildings. He is also chairman and CEO of Instatherm Company. He previously practiced law in New Jersey and has taught estate planning courses at the Rutgers University School of Law.

Peter R. Wilson, Ph.D., *Associate Professor of the Practice of Business Administration*; B.A. (University of North Carolina at Chapel Hill); M.B.A. (University of North Carolina at Greensboro); Ph.D. (University of North Carolina at Chapel Hill).

Professor Wilson teaches in the areas of financial accounting and financial statement analysis. His research interests are in behavioral decision theory, auditor decision making, and the use and interpretation of financial statement information. His current research

includes examining the effect of auditors' risk preferences on their decision behavior and studying the way in which analysts make use of financial information. His work has been featured in the *Wall Street Journal*. Prior to coming to Duke, Professor Wilson served on the faculty of the Stern School of Business at New York University.

Robert L. Winkler, Ph.D., *James B. Duke Professor of Business Administration and Senior Associate Dean for Faculty and Research*; B.S. (University of Illinois), Ph.D. (University of Chicago).

Prior to joining the Duke faculty, Professor Winkler served as Distinguished Professor of Quantitative Business Analysis at Indiana University, and he has held visiting positions at the University of Washington, the International Institute for Applied Systems Analysis, Stanford University, and INSEAD. His primary research interests involve Bayesian statistics, decision analysis, risk assessment, and probability forecasting. Professor Winkler is the author of numerous research articles and books and serves on the editorial boards of several journals.

William L. Yaeger, J.D., *Adjunct Associate Professor of Business Administration*; B.A. (Duke University), J.D. (Emory University).

Mr. Yaeger teaches the course Legal Environment of the Firm in the M.B.A. programs. He is in private practice in Durham, North Carolina, with an emphasis on bankruptcy and insolvency. Mr. Yaeger is a member of the North Carolina Bar Association and the National Association of Bankruptcy Trustees.

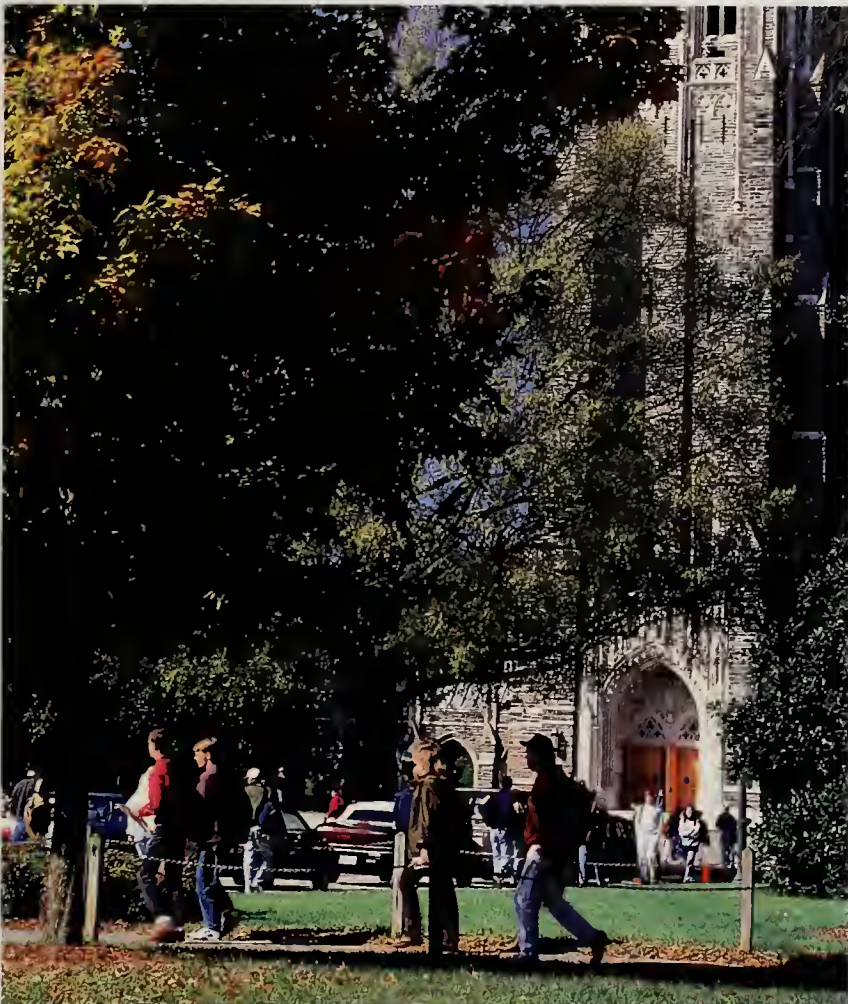
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Information and Regulations

Trinity College of Arts and Sciences
The School of Engineering



DUKE UNIVERSITY UNDERGRADUATE HONOR CODE

An essential feature of Duke University is its commitment to integrity and ethical conduct. Duke's honor system helps to build trust among students and faculty and to maintain an academic community in which a code of values is shared. Instilling a sense of honor, and of high principles that extend to all facets of life, is an inherent aspect of a liberal education.

As a student and citizen of the Duke University Community:

- I will not lie, cheat, or steal in my academic endeavors.
- I will forthrightly oppose each and every instance of academic dishonesty.
- I will communicate directly with any person or persons I believe to have been dishonest. Such communication may be oral or written. Written communication may be signed or anonymous.
- I will give prompt written notification to the appropriate faculty member and to the Dean of Trinity College or the Dean of the School of Engineering when I observe academic dishonesty in any course.
- I will let my conscience guide my decision about whether my written report will name the person or persons I believe to have committed a violation of this Code.

I join the undergraduate student body of Duke University in a commitment to this Code of Honor.

bulletin of
Duke University
1994-95

Information and Regulations

Trinity College of Arts and Sciences
The School of Engineering

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Duke University does not discriminate on the basis of race, color, national and ethnic origin, handicap, sexual orientation or preference, gender, or age in the administration of educational policies, admission policies, financial aid, employment, or any other university program or activity. It admits qualified students to all the rights, privileges, programs, and activities generally accorded or made available to students. For further information, call Leonard C. Beckum, university vice-president and vice-provost, (919) 684-4736. Duke University has adopted procedures for investigation and remedy of complaints involving discrimination. See the chapter "Campus Life and Activities."

Information that the university is required to make available under the Student Right to Know and Campus Security Acts may be obtained from the Office of University Relations at 684-2823 or in writing at 615 Chapel Drive, Duke University, Durham, NC 27708.

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University Calendar, 1994-95

Fall, 1994

August		
24	Wednesday—	Orientation begins; assemblies for all new undergraduate students
29	Monday, 8:00 A.M.—	Fall semester classes begin
September		
5	Monday—	Labor Day, classes in session
9	Friday—	Drop/Add ends
October		
14	Friday—	Last day for reporting midsemester grades
14	Friday, 7:00 P.M.—	Fall break begins
19	Wednesday, 8:00 A.M.—	Classes resume
26	Wednesday—	Registration begins for spring semester, 1995
November		
4-6	Friday-Sunday—	Parent's Weekend
13	Sunday—	Registration ends for spring semester, 1995
14	Monday—	Drop/Add begins
18-20	Friday-Sunday—	Homecoming
23	Wednesday, 12:40 P.M.—	Thanksgiving recess begins
28	Monday, 8:00 A.M.—	Classes resume
December		
8	Thursday, 7:00 P.M. —	Fall semester classes end
9-11	Friday-Sunday—	Reading period
11	Sunday—	Founder's Day
12	Monday—	Final examinations begin
17	Saturday, 10:00 P.M.—	Final examinations end

Spring, 1995

January		
11	Wednesday—	Registration and matriculation of new undergraduate students
12	Thursday, 8:00 A.M.—	Spring semester classes begin
25	Wednesday—	Drop/Add ends
February		
24	Friday—	Last day for reporting midsemester grades
March		
10	Friday, 7:00 P.M.—	Spring recess begins
20	Monday, 8:00 A.M.—	Classes resume
29	Wednesday—	Registration begins for fall semester, 1995, and summer, 1995
April		
13	Thursday—	Registration ends for fall semester, 1995; registration for summer, 1995 continues
14	Friday—	Drop/Add begins
26	Wednesday, 7:00 P.M.—	Spring semester classes end
27-30	Thursday-Sunday—	Reading period begins
May		
1	Monday—	Final examinations begin
6	Saturday, 10:00 P.M.—	Final examinations end
12	Friday—	Commencement begins
14	Sunday—	Graduation exercises. Conferring of degrees

University Administration

GENERAL ADMINISTRATION

Nannerl Overholser Keohane, Ph.D., *President*
John W. Strohbehn, Ph.D., *Provost*
Ralph Snyderman, M.D., *Chancellor for Health Affairs and Dean, School of Medicine*
Charles E. Putman, M.D., *Executive Vice-President for Administration*
Eugene J. McDonald, LL.M., *Executive Vice-President — Asset Management*
John F. Burness, A.B., *Senior Vice-President for Public Affairs*
John J. Piva, Jr., B.A., *Senior Vice-President for Alumni Affairs and Development*
John F. Adcock, B.S., *Vice-President and Corporate Controller*
Leonard C. Beckum, Ph.D., *University Vice-President and Vice-Provost*
Tom A. Butters, B.A., *Vice-President and Director of Athletics*
Janet Smith Dickerson, M.Ed., *Vice-President for Student Affairs*
J. Peyton Fuller, A.B., *Vice-President, Planning and Treasurer*
William J. Donelan, B.A., M.S., *Vice-Chancellor and Chief Financial Officer for Medical Center Administration*
Gordon G. Hammes, Ph.D., *Vice-Chancellor for Medical Center Academic Affairs*
Mark C. Rogers, M.D., *Vice-Chancellor for Health Services and Executive Director, Duke University Hospital*
R. C. Bucky Waters, B.S., M.A., *Vice-Chancellor for Special Projects, Duke University Medical Center*
David B. Adcock, J.D., *University Counsel*
N. Allison Haltom, A.B., *Secretary of the University*
William H. Willimon, M.Div., S.T.D., *Dean of the Chapel*

Trinity College

Richard A. White, Ph.D., *Dean and Vice-Provost for Undergraduate Education*
Lee W. Willard, Ph.D., *Assistant Dean for Planning and Special Programs*
Gerald L. Wilson, B.D., Ph.D., *Senior Associate Dean for Administration; Social Sciences and Pre-Law*
Martina J. Bryant, Ed.D., *Associate Dean for Social Sciences and Pre-Business*
Mary Nijhout, Ph.D., *Associate Dean for Natural Sciences and Pre-Graduate School Advisor*
Ellen W. Wittig, Ph.D., *Associate Dean for Humanities*
Caroline L. Lattimore, Ph.D., *Assistant Dean for Social Sciences*
Christa T. Johns, Ph.D., *Director of Foreign Academic Programs and Assistant Dean for Study Abroad*
Judith G. Ruderman, Ph.D., *Assistant Dean for Summer Session and Continuing Education*
Norman C. Keul, Ph.D., *Assistant Dean for Pre-Majors and Director of the Pre-Major Advising Center*
Kay H. Singer, Ph.D., *Assistant Dean for Natural Sciences, Director of Health Professions Advising Center, and Director of Center for Science Education*

The School of Engineering

Earl H. Dowell, Ph.D., *Dean*
Marion L. Shepard, Ph.D., *Associate Dean for Undergraduate Affairs*

Student Affairs

Janet Smith Dickerson, M.Ed., *Vice-President for Student Affairs*
Richard L. Cox, M.Div., Th.M., Ed.D., *Associate Vice-President for Student Affairs and Dean, University Life*
Maureen D. Cullins, A.B., A.M., *Assistant Vice-President and Dean of Campus Community Development*
Suzanne Wasiolek, M.H.A., J.D., *Assistant Vice-President and Dean of Student Development*
Jake Phelps, B.A., *Director of External Relations for Student Affairs and Assistant to the Associate Vice-President*
Homai McDowell, M.M.S., D.B.A., *Director of Financial Services and Major Projects*
Caroline Nisbet, B.A., M.A., *Director of Planning*

Career Development Center

John H. Noble, A.B., M.S., *Director*
John C. Barrow, Ed.D., *Director of Career Discovery Programs*
Laurence Maskel, Ph.D., *Director of International Programs*
Donna Harner, A.B., *Assistant to the Director, Career Specialist*
Patricia O'Connor, Ed.D., *Career Specialist*
Dian Poe, B.A., *Career Specialist*
Virginia Steinmetz, Ph.D., *Career Specialist*
Sandra M. Tuthill, *Career Specialist*
Gail Williams, B.A., M.A., *Career Specialist*
Delphinia Avent, B.A., *Career Librarian*

Duke Debate

Richard O'dor, Ph.D., *Director*

Counseling and Psychological Services

John C. Barrow, Ed.D., ABPP, *Interim Co-Director*
Libby E. Webb, M.S.W., BCD, *Interim Co-Director*
Christine Bell, M.S.W., BCD, *Clinical Social Worker*
Robin Buhrke, Ph.D., *Psychologist*
Lucile Clotfelter, M.D., *Psychiatrist*

Rolffs S. Pinkerton, Ph.D., ABPP, *Psychologist*
Kenneth Rockwell, M.D., *Psychiatrist*
Joseph E. Talley, Ph.D., ABPP, *Psychologist*

International House

Carlisle C. Harvard, B.A., *Director*

Intercultural Affairs

Julian B. Sanchez, M.Ed., *Director*
Linda Capers, B.A., *Program Coordinator*

Religious Life

William H. Willimon, M.Div., S.T.D., *Dean of the Chapel*
Debra K. Brazzel, M.Div., *Assistant Dean of the Chapel and Director of Religious Life*
Hubert Beck, M.Div., *Lutheran Campus Pastor*
Nancy Ferree-Clark, M.Div., *Pastor to the Congregation at Duke Chapel*
Susan D'Arcy Fricks, M.Div., *Presbyterian Campus Minister*
Scott Hawkins, M.A., *International Students Inc. Campus Minister*
Steve Hinkle, M.Div., *Inter-Varsity Christian Fellowship Staff*
Anne Hodges-Copple, M.Div., *Chaplain to Episcopal Community at Duke*
David Oli Jenkins, M.Div., *Campus Minister to Methodist Students*
Brenda Kirton, M.Div., *Black Campus Minister*
Michael Landy, B.A., *Director, Duke Hillel Foundation*
Peg Oravez, M.A., *Catholic Campus Minister*
Kevin Primus, B.A., *Cambridge Christian Fellowship Intern*
Ted Purcell, D.Min., *Baptist Campus Minister*
Kara Reed, B.A., *Staff Advisor for Cambridge Christian Fellowship*
Mike Shugrue, M.A., *Catholic Campus Minister*
Dean Storelli, M.A., *Navigators Staff Intern*
Sam Thomsen, B.A., *Acting Campus Director for Campus Crusade for Christ*
Jon Vermilion, B.S., *Campus Crusade Intern*

Student Development

Karen L. Steinour, Ph.D., *Dean of Students/Student Development*
Benjamin Ward, Ph.D., *Associate Dean of Student Development, Faculty Program*
W. Paul Bumbalough, A.B., *Associate Dean of Students/Student Development*
Charles M. VanSant, M.Div., *Associate Dean of Students/Student Development*
William K. Burig, M.Ed., *Assistant Dean of Student Development, Housing*
Frank H. McNutt, B.A., *Assistant Dean of Student Development*
Marta N. Perez, A.B., *Assistant Dean of Student Development*

Student Health

William A. Christmas, M.D., F.A.C.P., *Director*
Loretta Stenzel, M.D., *Assistant Director*
Linda Carl, Ph.D., *Coordinator, Health Education*
Jeanine Atkinson, M.S., *Substance Abuse Specialist*
Lisa Barber-Murphy, M.Ed., C.H.E.S., *Health Educator*
Penny Sparacino, R.N., *Nursing Supervisor, University Infirmary*

University Life

Susan L. Coon, M.A., *Associate Dean, Coordinator of the University Union*
Peter Coyle, A.B., *Senior Assistant Dean*
Beth Budd, B.A., M.A., M.B.A., *Assistant Dean*
Krista Cipriano, B.F.A., *Assistant Dean*
Pauline G. Myers, *Assistant Dean*
Linda Studer-Ellis, B.A., *Assistant Dean*

The Women's Center

Ellen Plummer, M.S.W., *Interim Director*
Selden Holt, A.B., *Interim Coordinator of Sexual Assault Support Services*
Elaine Allen, M.T.S., *Program Coordinator*

Student Services



A number of resources within the university are relied upon by undergraduate students for counseling and information relating to both academic and personal matters. In addition, the university provides a variety of services for students in areas such as health care and postgraduate employment. Some of these resources and services are available through the offices of the individual school and college; others are provided by university-wide offices and departments. For additional information consult the *Bulletin of Undergraduate Instruction*.

Administrative Offices of the School and College

TRINITY COLLEGE

The Dean of Trinity College and Vice-Provost for Undergraduate Education, Dr. Richard A. White. The dean is the university's executive officer for the academic affairs of undergraduate students in Trinity College. The vice-provost for undergraduate education recommends to the provost policies concerning the affairs of all undergraduates at the university.

The dean is responsible for programmatic development, maintaining the quality of the academic programs, and fostering teaching excellence in Arts and Sciences. The dean in conjunction with the dean of the faculty of Arts and Sciences recommends to the provost policies and budget needs concerning the undergraduate college in its goal to provide a distinguished liberal arts college experience within the context of a nationally competitive research university. The dean implements the policies and acts as chief budget officer in relation to them. The dean is assisted in executing these responsibilities by the associate dean of Trinity College and the academic deans.

The dean assists the Offices of Development and Alumni Affairs in their fund raising efforts for the university as a whole.

The Senior Associate Dean for Administration, Gerald L. Wilson. The senior associate dean for administration coordinates the work of the Trinity College staff and serves as its review officer in cases involving appeals on decisions of the academic deans of the college and on academic appeals of the Undergraduate Judicial Board. The dean also confers with students who have not cleared their accounts with the bursar.

Associate Deans of Trinity College Martina Bryant, Mary Nijhout, Gerald Wilson, and Ellen Wittig. Assistant Deans of Trinity College Christa Johns, Norman Keul, Caroline Lattimore, and Kay Singer. The associate and assistant deans of Trinity College are often referred to as the students' "academic deans." In the college they are responsible for a wide range of activities. In general, the academic deans advise students about academic matters, careers, fellowships, preprofessional planning, Program II, foreign study, and any other issues of academic concern to students; supervise individual student's progress toward graduation and certify completion of degree requirements;

administer and coordinate programs; provide information about programs, advising, policies, procedures, and regulations to faculty members requesting it; enforce academic regulations; serve on various UFCAS, university, and Trinity College committees; act as editors of, or as liaisons with editors of Trinity College publications such as the *Undergraduate Bulletin*; and perform other duties delegated by the dean or associate dean of Arts and Sciences and Trinity College.

A dean serves as director of the Pre-Major Advising Center for first-year students and for sophomores who have not declared a major. The other academic deans are divisional advisers—in the humanities, the natural sciences, and mathematics, and the social studies divisions—for all students who have declared a major. (See Administration of the College, above.) The relationship between these academic deans and the faculty advisers is a complementary one. Faculty advisers have primary responsibility for advising about major courses and requirements. The academic deans monitor graduation requirements, handle requests for exceptions, and deal with unusual academic problems and any change of status questions.

THE SCHOOL OF ENGINEERING

Dean Earl H. Dowell. The dean of the School of Engineering has overall responsibility for instruction and research in the school as well as for the educational experience and welfare of its students. The dean works with various constituencies including the university administration, faculty, students, and alumni on matters of general policy and delegates responsibilities within the school to members of his staff.

Associate Dean Marion L. Shepard. The associate dean has responsibility for academic matters pertaining to undergraduates, and for working with the academic departments in helping to establish student's programs of study. He counsels with first-year students before they arrive on campus, and through summer correspondence with them, assists in making preliminary selection of courses for the fall semester. He also plans and directs the orientation of the first-year students. Under his supervision, engineering faculty members serve as advisers to students. He approves leaves of absence, courses to be taken elsewhere, the dropping and adding of courses, academic probation, dismissal or withdrawal from the school, transfer into or out of the school, and similar matters. He serves as the dean's deputy in representing the school on campus, among alumni, friends, supporting industries, and governmental organizations. He also provides primary liaison with the Career Development Center.

FACULTY ADVISING

Apart from academic counseling of students by faculty members whom they come to know on an informal basis, faculty advising of undergraduates in Trinity College and the School of Engineering takes place in three primary ways. First, in Trinity College, faculty members serve in the Premajor Advising Center as general academic advisers to groups of first-year students and premajor sophomores and are available for individual conferences; second, in the School of Engineering, first-year students and sophomores are counseled by special faculty advisers before the students choose their department; and third, in all departments, the director of undergraduate studies and other faculty advisers are available to assist students concerning academic matters pertaining to their departments.

Student Affairs

Vice-President for Student Affairs, Janet Smith Dickerson, 106 Flowers. The vice-president for student affairs has the ultimate responsibility for most noncurricular aspects of a student's activity and welfare and works directly with the following offices in fulfilling that responsibility.

Associate Vice-President for Student Affairs and Dean, University Life, Richard L. Cox, 209 Flowers Building. The associate vice-president has budgetary and managerial oversight for all university “common ground” cultural and social activities: Cultural Affairs, the Artists Series, the University Union and all related activities, Broadway at Duke, the Mary Lou Williams Cultural Center, Debate, and Student Activities. The associate vice-president also serves as the principal Student Affairs liaison to the Institute for the Arts and to the university campus ministries. He initiates and oversees Student Affairs development initiatives in these and related Student Affairs areas and is available as needed to plan and to respond to all issues related to the public community life of the university.

Counseling and Psychological Services, Suite 214, Page Building (CAPS). The CAPS staff provides a coordinated and comprehensive range of counseling and psychological services to meet the unique needs of individual students in regard to their own personal development.

Services are available to all undergraduate, graduate, professional, and allied health students who pay the student health fee. There are no additional costs for these services. They include evaluation and brief counseling/psychotherapy regarding personal concerns of a wide variety. These include family, social, academic, and sexual matters. The professional staff is composed of psychologists, clinical social workers, and psychiatrists who are experienced in working with young adults. Individual, couples, and group counseling and psychotherapy are utilized in helping students resolve their concerns once the student and staff member have identified together the most helpful alternative. Some CAPS staff who are trained as professional career counselors offer counseling for career indecision through the Career Development Center.

CAPS also offers time-limited seminars and groups focusing on personal development. These groups have the advantage of pooling resources and support while at the same time teaching skills. Themes addressed by groups in the past have included coping with stress, understanding and enhancing relationships, and overcoming eating disorders. Support groups have also been offered for students in special circumstances. New groups can be developed to meet student needs.

Another important function of CAPS is the availability of the staff to the entire university community for consultation and educational activities regarding student development and mental health issues. Offices with which CAPS has liaisons include the Career Development Center, Student Development, Student Health, Religious Life, and the Women’s Center. CAPS also provides consultation and programming for student groups such as resident advisors, first-year-student advisory counselors, PI-SCES, and PICAD counselors.

Standardized testing is also administered for the university by CAPS, including graduate and professional school admission tests such as the LSAT, MCAT, and GRE.

CAPS maintains a policy of **strict confidentiality** concerning information about each student’s contact with CAPS staff members. Such information can be released, however, with the student’s specific written authorization. If appropriate, a referral may be made to other staff members or a variety of local resources including multidisciplinary mental health professionals in private practice and clinic settings.

CAPS offices are centrally located in Suite 214, Page Building, next to the Chapel on West Campus. Appointments may be made by calling 660-1000 Monday through Friday between 8 A.M. and 5 P.M. However, if a student’s concern needs immediate attention, this situation should be made known to the secretary, and every effort will be made to arrange for a counselor to talk with the student immediately.

The Office of Campus Community Development, 109 Flowers Building. The office provides advocacy and support to students who may face challenges based on their identities or interests through outreach and programming conducted by the Community Service Center, the Office of Intercultural Affairs, International House, and

the Women's Center. Where no formal offices exist, the Office of Campus Community Development provides support and advocacy for lesbian, gay, and bisexual students. Sororities and fraternities also are advised by this office.

International House, Carlisle C. Harvard, Director, 2022 Campus Drive. International House is the center of cocurricular programs for more than 700 students from 75 countries who are presently enrolled at Duke. Programs which assist students from abroad in participating in the life of the Durham and Duke communities include: an intensive orientation program at the beginning of the academic year; the International Friends Program, in which interested international students may become acquainted with local families or individuals; the Duke Partners Program which pairs a U.S. partner and a visiting partner for weekly meetings to practice English and to learn about each other's cultures; the International Wives Club, which provides a structure for international women to meet with local women in an informal atmosphere; the Speakers' Bureau, which arranges for international students to speak at civic and social groups as well as schools in the Durham community; intermediate-level English conversation and grammar classes which meet twice a week; the Friday coffee break in the basement of the Chapel which is sponsored by Campus Ministry especially for internationals and friends. The International Association is a student organization which includes a significant number of U.S. American citizens, as well as international students. The association plans social and cultural programs which emphasize personal contact and the informal exchange of ideas among students from diverse backgrounds. Included are weekly open-houses with lectures, films, pot-luck dinners or parties, and periodic trips outside of Durham.

A new program, begun in 1993, is a group for "Global Nomads." Global Nomads are U.S. and international students who have spent their formative years living outside their countries of passport due to their parents' occupation—diplomatic corp, military, missionary, international business, or intergovernmental agency. Additional information may be obtained by writing to Carlisle C. Harvard, Director, International House, Box 90417, Duke University, Durham, North Carolina 27708.

The Office of Intercultural Affairs, Julian B. Sanchez, Director, 107 Union West. The Office of Intercultural Affairs holds responsibility for identifying and assisting with changes in the Duke University community which promote optimum growth and development for African-American, Asian-American, Latino-American, and Native American undergraduate and post-baccalaureate students. The office conducts such activities as public forums on student life, mentorship projects with university alumni, seminars on current issues for students of color, institutional research on student of color development, and serves as a resource for issues involving students of color and diversity for the university community.

The Office of Religious Activities, William H. Willimon, Dean of the Chapel. The dean of the Chapel and a combined staff of twenty-two are responsible for providing a diversity of ministry which takes seriously Duke University as a pluralistic religious community. This broad ministry includes services of worship (both in Duke Chapel and in other locations in the university), programs of religion and the arts, opportunities to develop caring and serving communities, and opportunities to respond to critical social issues. Chaplains and campus ministers are also available for individual counseling with students and others in the university community.

The Office of University Life, 101-3 Bryan Center. University Life is a diverse team which is committed to excellence in education through programming, advising, and services in the arts, entertainment, and recreation which are integral to university and community life.

It encompasses an advising component, which includes Duke Student Government, recognized student organizations (undergraduate and graduate) and the University

Union. The office serves as a liaison between the university administration and campus groups, clubs, and organizations. The office offers workshops and other instructional and programmatic aids to promote the development of leadership, technical, and organizational skills within student groups. The office also provides financial record-keeping assistance and training.

The University Union brings students together to stimulate, promote, and develop the social, recreational, cultural, and educational activities of the Duke University community. The Union sponsors a broad program including lectures, concerts, recreational activities, fine arts presentations, and exhibits. Also included are creative opportunities such as the Craft Center, original film productions, and the campus' radio station and closed-circuit cablevision broadcasting system.

University Life includes a staff-initiated programming team, which manages such events as the Duke Artists Series, the Chamber Arts Society Series and the Summer Festival of the Arts, as well as the Mary Lou Williams Jazz Festival. It schedules Page Auditorium and directs the use of the hall. In addition to these arts-related activities, the Duke University *Yearly Calendar* is published and distributed from the office. In order to avoid conflicts, all campus events should be recorded by the calendar office as early as possible.

The Office of Student Development, Suzanne Wasiolek, Assistant Vice-President of Student Affairs and Dean of Student Development, and Karen Steinour, Dean of Students, Crowell Building, East Campus. This office works with the Duke student body in a variety of ways and is concerned with creating a residential community supportive of a solid educational experience. It advises individual students regarding personal problems, houses undergraduates in the residence halls, and assists students to plan and present educational and cultural programs within the residence halls. One hundred twenty resident advisors (RAs), who are staff members of the Office of Student Development, reside in the residence halls and are directly responsible for the administration of the student residences and their programs. They also are available for counseling students and/or referring them to the various personnel services which provide specialized advice or counsel. The office develops and implements the orientation program for new students. First-year student advisory counselors (FACs), who are upperclass men and women selected for qualities of responsibility and leadership, work through the Office of Student Development. Members of the FAC program are assigned to a small group of first-year students and, during orientation, welcome their groups and help to acquaint them with the university. Judicial affairs are handled through the office by coordinating and applying the general rules and regulations of the university as well as working with all participants involved in the judicial process and coordinating the student advising system. The Office of Student Development also works with transfer students and the Transfer Committee, advises student residential living groups, coordinates the student mediation program, assists handicapped students, and coordinates the Student Health and Student Insurance Policies.

The Women's Center, 126 Few Federation. An office of student affairs located at 126 Few Fed, across from the Allen Building and behind the Sigma Alpha Epsilon fraternity section. The Women's Center works to increase awareness of gender issues and to promote a better understanding of how they affect women and men, students, faculty, and university staff. The Women's Center offers support, educational programming, information, and referral on health, safety, personal and professional development, and the intersection of gender with race, class, and sexual orientation. The center advises student groups including BASES (Building Awareness through Share of Experiences), the Women's Coalition, Men Acting for Change, and Duke Panhellenic, and it serves as an advocate for individuals and groups experiencing gender-related problems like sexual harassment or gender discrimination.

The Women's Center also houses the Office of Duke's Sexual Assault Support Services Coordinator, who provides crisis counseling and advocacy for survivors of sexual violence or child sexual abuse and oversees programming on rape and sexual assault. Among the education and support services offered are DARE (Duke Acquaintance Rape Education) and Safe Haven, a space staffed by trained volunteers and open from 11 P.M. to 7 A.M. on Friday and Saturday nights. Safe Haven can be used by women who need a safe place from which to place telephone calls, wait for a ride, receive first aid, or who have experienced a problem.

The Women's Center works in cooperation with many groups and offices on campus—including CAPS, Women's Studies, cultural groups, DGLA, Student Health and the Institute of the Arts—to develop and implement programs, as well as continually to assess and respond to the changing needs and conditions of the university community. Open Monday through Friday from 8:30 A.M. to 5:00 P.M., the Women's Center invites students to drop by its art gallery and to browse through its library and resource files. The center also makes available Few Fed lounge for group meetings and programs. Call 684-3897 with any scheduling questions.

Student Health Services

Student Health Program, William A. Christmas, M.D., F.A.C.P., Director, Trent Hall. The Student Health Program is an office of student affairs and is administered by the Department of Community and Family Medicine, Duke University Medical Center. Medical services are provided by board-certified family physician faculty, physician assistants, and nurse-practitioners.

DUKE FAMILY MEDICINE CENTER (684-6721), located in the Pickens Building on the corner of Erwin Road and Trent Drive, is the primary location for medical care. Students are seen by appointment Monday-Friday, 7:00 A.M.–8:00 P.M., Saturdays from 10:00 A.M.–1:30 P.M., and Sundays from 2:00 P.M.–4:30 P.M. A wide variety of services are available:

Primary care services for illness and injury	Travel advice and immunizations
Health promotion/disease prevention services	X-rays
Gynecologic care	Cold/flu self-help table
Health education	Allergy and immunizations
Sports medicine	Nutrition counseling
Laboratory	Pharmacy

In order to allow coordination of health care, students should use the Duke Family Medicine Center as their portal of entry to other health resources, including the specialty clinics at Duke University Medical Center, when needed.

For problems arising after hours, students should call the Infirmary (684-3367). After consulting with the physician on call, the nurse may advise the student to come to the Infirmary or to the Duke Emergency Department (684-2413) for further evaluation. In the event of a life-threatening emergency, students should go directly to the Emergency Department in Duke Hospital North. If necessary, Duke Public Safety (911 or 684-2444) will provide on-campus transportation to the Emergency Department, the Infirmary, or the Duke Family Medicine Center.

THE INFIRMARY (684-3367), located on the fourth floor of Duke University Hospital-South Division, Purple Zone, provides inpatient treatment of illnesses too severe to manage in the residence hall or apartment, but not requiring hospitalization. The Infirmary is open during the regular academic year, and is closed during the summer and winter recesses.

HEALTH EDUCATION. Health education staff assists students in making informed decisions regarding their health at the Healthy Devil Health Education Center, Room 113, House O, Kilgo Arch, 11 A.M.-4 P.M., Monday - Friday, 684-3620, ext. 325 (walk in or by appointment) and at Health Education Administration, Duke Family Medicine Administrative Suite, 146 Trent Hall.

Services, Information, and Counseling Include:

- Nonprescription cold and flu medications (Healthy Devil, Duke Family Medicine Center, Duke South Infirmary)
- Safer sex
- Contraception
- Sexually transmitted diseases, including HIV/AIDS
- Alcohol and drug related issues
- Nutrition and weight management
- Eating disorders
- Stress management
- Women's health issues

SPORTS MEDICINE SERVICES. Card Gym Sports Physical Therapy is located on West Campus, in the basement of Card Gym. A physical therapist is available from 3:00-5:00 P.M. weekdays, on a walk-in basis, to assess exercise-related problems, and to outline short-term treatment plans to aid recovery and help prevent re-injury. The Sports Medicine Clinic is located on the third floor of the Finch-Yeager Building adjacent to Wallace Wade Stadium. These students may be seen by a student health physician, by appointment (684-6721).

COUNSELING AND PSYCHOLOGICAL SERVICES (660-1000) is a complementary service to the Student Health Program. Mental health and career counseling services are available, as detailed in the CAPS section of this bulletin.

HEALTH FEE. All currently enrolled full-time students and part-time degree candidates are assessed a student health fee. This covers most services rendered within the Student Health Program during each enrolled semester. A description of services covered by the health fee is in the literature distributed to all entering students. An optional summer health fee for students not enrolled in Summer Session but registered for upcoming fall classes is available through the Office of the Bursar.

HEALTH INSURANCE is essential to protect against the high cost of illnesses or injuries which require hospitalization, surgery, or the services of specialists outside the Student Health Program. All students are strongly encouraged to be certain that they have such insurance. For those not adequately covered by other insurance, the Duke Student Insurance Plan (underwritten by Blue Cross and Blue Shield) is specifically designed to complement the coverage provided by the student health fee. Coverage for the student's spouse and dependent children may be purchased. This insurance covers students both on and off campus, throughout the one year term of the policy. International students are required to show proof of health insurance coverage (either the policy offered by Duke or comparable coverage) and may not assume responsibility for personal payment of health care cost. Further information about this plan may be obtained by calling Hill, Chesson, and Associates (489-7426).

Policy Regarding Medical Excuses.

1. Class absences may be excused only by the academic dean upon certification from Student Health Program staff. Such certification must indicate that the illness (a) is of such a nature that it is necessary to restrict a student's activities and/or (b) medication has been prescribed which may impair the student's ability to study or attend class; and/or (c) the student has been a patient in the

university Infirmary. In cases where illness occurs away from campus, appropriate information must be presented to a student health clinical provider.

2. Absences cannot be excused by the dean if they result from minor illnesses which do not require that a student's activities be restricted or if Student Health Program staff were not contacted during the actual time of the illness.

Students who have any questions concerning these policies and procedures or individual cases should contact their academic dean.

Confidentiality. Information about a student's physical or mental health is confidential and can only be released with the student's permission. This policy applies regardless of whether the information is requested by university officials, friends, family members, therapists, or physicians not involved in the student's immediate care.

IMPORTANT TELEPHONE NUMBERS

Scheduling Appointments at Duke Family Medicine Center: 684-6721

Student Health Program Administration: 684-3620, ext. 267

University Infirmary: 684-3367

Health Education: 684-3620, ext. 325

For Emergency Transportation (University Public Safety) day or night

On campus: Campus Police: 684-2444

Off campus: Durham Ambulance Service, Durham telephone: 477-7341

All students receive a description of the Student Health Program with their bursar's bills as well as the services covered by the student health fee. Additional copies of this information are available at Duke Family Medicine Center and the Office of Student Development.

Department of Housing Management

Fidelia Thomason, Director, 218 Alexander, Apartment E. The Department of Housing Management, an Administrative Services Division auxiliary, is responsible for residence hall and apartment facilities on East, West, Central, and North Campuses. The department has responsibility for the following services: physical maintenance of the residential buildings with work performed by the Facilities Management Department in the residence halls and Housing Management in the apartments, custodial care of the residential facilities, key issue and control (rooms and buildings), storage of personal effects, and control of furniture and equipment. Housing Management is also responsible for summer assignments and graduate student academic year and summer assignments in Central Campus Apartments. Business matters related to residential fees and rents come under the purview of the department. Residence hall and apartment business matters should be discussed with the Housing Administration Office, 218 Alexander, Apartment B. Questions about a student's facility service needs should be discussed with the residential area service office: 101R House D, 684-5486, for residents of main West Campus except Few; House VOO, 684-5559, for residents of Few and Edens; Hanes House desk, 684-5394, for residents of Hanes and Trent; Gilbert-Addoms desk, 684-5320, for residents of East Campus; and 217 Anderson Street, 684- 5813, for residents of Central Campus.

Office of Alumni Affairs

Laney Funderburk, Director, 614 Chapel Drive. The Alumni Affairs Office initiates and sponsors a variety of activities and services linking Duke students with one of the university's best resources—its alumni. Students are encouraged to take advantage of DukeSource and the Conference on Career Choices, thereby strengthening student-alumni relationships. These two programs are administered by the Career Development Center.

The class pictorial directory for first-year students, one of the most closely read books received, is sponsored by the Duke Alumni Association and published by Alumni Affairs. Many get-togethers are planned for new and current students, both on and off campus. Also, the Alumni Office staff assists the undergraduate class officers in planning activities and promoting projects.

The president of DSG and undergraduate class presidents serve on the Board of Directors of the Duke Alumni Association and its committees. *Duke Magazine*, published bimonthly by Alumni Affairs, is offered by subscription to parents of students.

Career Development Center

John H. Noble, Director, Page Building. The mission of the Career Development Center is to educate the students of Duke University in the arts of self-assessment, career exploration, career planning, and job hunting with the goal of helping them develop rewarding and fulfilling careers. The center primarily serves the students and alumni/ae of Trinity College, the School of Engineering, and the Graduate School.

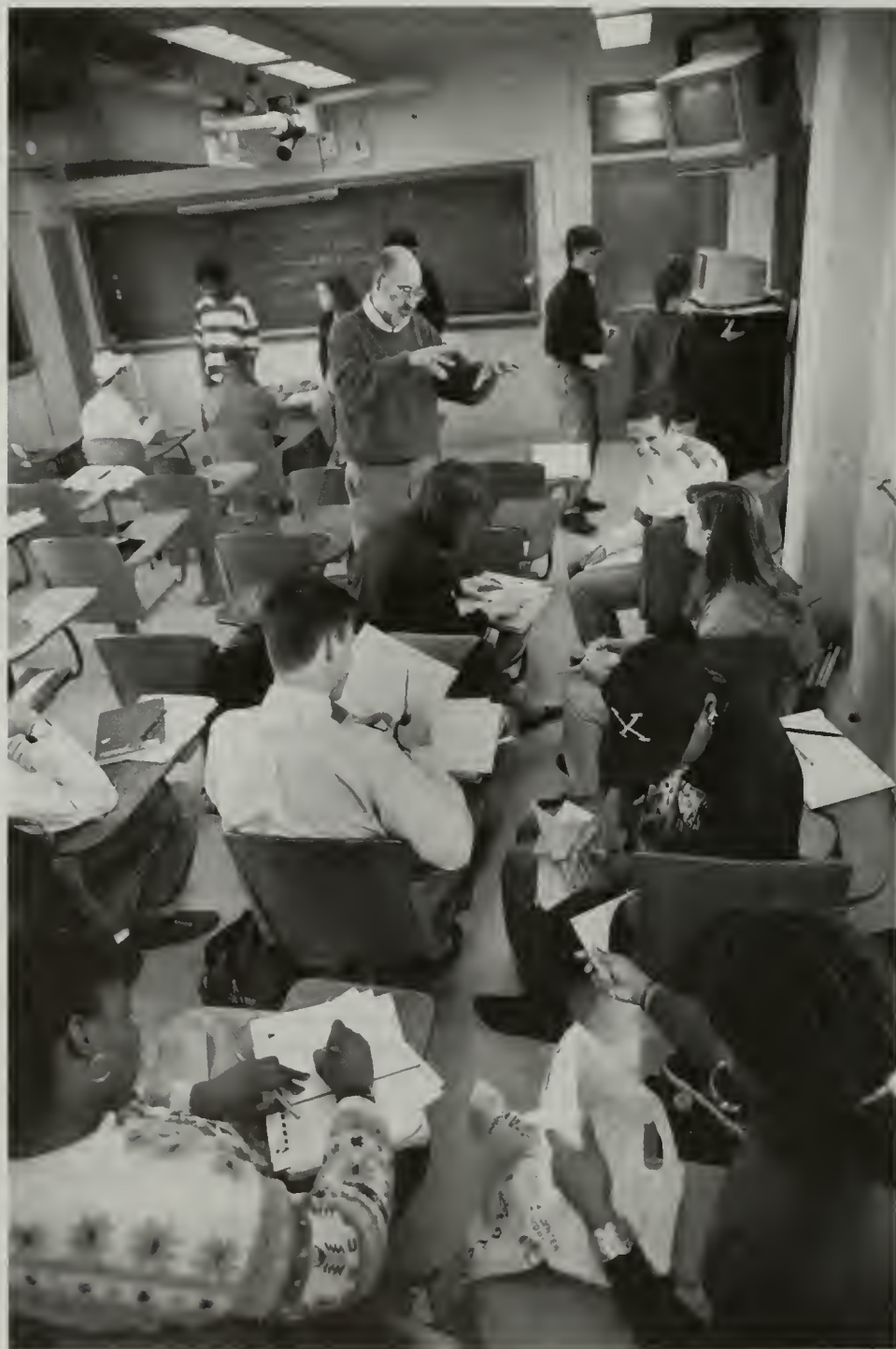
Career counselors are on staff helping students early in their lives at Duke to begin the process of discovering career interests. Career specialists then help students focus on specific career fields, including business, education, engineering and computer science, health and life sciences, government and public sector, public and community service, and media and the arts. Career specialists also work closely with the faculty and deans of Trinity College in directing students' interest towards effective application to graduate and professional schools.

Programs and services of the center include the Career Apprenticeship Program offering semester-long internships in local area businesses, the Health Careers Internship Program offering experiences at the Medical Center and elsewhere in Durham, the Service Learning Project offering stipends for summer work in community service, the Hospital School Tutors Program providing teaching opportunities, the On-Campus Recruiting Program offering interviews for summer and permanent positions with a wide variety of national organizations, and the Credential Service which collects and sends letters of recommendation.

The *Career Spectrum*, a weekly newsletter published on Mondays in *The Chronicle*, is designed to keep students constantly aware of career-related opportunities on- and off-campus. Announcements of job openings, career seminars, workshops, and information sessions are announced each week. The Career Library and J.O.B. Room provide a wealth of printed and database materials on specific career fields and specific employers. DukeSource is the center's group of thousands of alumni/ae career advisors from all over the country and overseas who have volunteered to help Duke students find out more about specific career fields and job-hunting strategies within those fields.

CareerSource, a new on-line computer career database, provides information at computer clusters located throughout the university. By using CareerSource, a student may review bulletins, information about the center, review summer and full-time job listings, and register to participate in center programs.

Academic Information



Miscellaneous Academic Policies and Procedures

PROCEDURE FOR RESOLUTION OF STUDENTS' ACADEMIC CONCERNS

Trinity College provides formal educational opportunities for its students under the assumption that successful transmission and accumulation of knowledge and intellectual understanding depend on the mutual efforts of teachers and students. Ideally, the college offers a range of learning experiences in which students strive to learn enough to be able to test their ideas against those of the faculty, and faculty, through the preparation of course materials and the freshness of view of their students, discover nuances in their disciplines.

Sometimes, however, student-faculty interrelationships in certain courses give rise to concerns that, for whatever reason, can inhibit successful teaching and learning. When this occurs students often need assistance in resolving the issues.

The faculty and administration of Trinity College attempt to be genuinely responsive to all such matters and a student should not hesitate to seek assistance from faculty and administrative officers in resolving problems.

Questions about course content, an instructor's methods of presentation, the level of discourse, criteria for evaluation of students, or about grades or administrative procedures in a course, should be directed to the instructor of the course. If a student believes that productive discussion with the instructor is not possible, courtesy requires that the instructor be informed before the student refers questions about the course to the director of undergraduate studies or, in his or her absence, to the chairman of the department. If a student's concern involves a departmental policy rather than an individual course, the student should first confer with the director of undergraduate studies in the department. A list of the names, addresses, and telephone numbers of the various directors of undergraduate studies can be found in the *University Directory*. Staff members in the department offices can assist in arranging appointments with the directors. When necessary, directors of undergraduate studies may refer students to the department chairman.

A student in doubt about how to proceed in discussing a particular problem, or who seeks resolution of a problem, is encouraged to confer with an academic dean of Trinity College.

In those exceptional cases where a problem remains unresolved through informal discussion, a formal procedure of appeal to the dean of Trinity College is available. A student may initiate this more formal appeal procedure by bringing his or her problem—with assurance of confidentiality, if requested—to the attention of the dean of Trinity College, who will request information about the nature of the issue and about the earlier efforts made to deal with it.

Harassment Policy Statement

This Harassment Policy applies to all persons who are enrolled or employed by Duke University. All such persons may use the accompanying grievance procedures in seeking resolution of harassment complaints involving other members of the Duke University community.+ (The policy is effective January 1, 1994.)*

Harassment of any kind is not acceptable at Duke University; it is inconsistent with the university's commitments to excellence and to respect for all individuals. Duke University is also committed to the free and vigorous discussion of ideas and issues, which the university believes will be protected by this policy. Pursuant to these commitments, and as a complement to Duke University's Equal Opportunity Policy, the following policy is adopted.

- I. Duke University is committed to protecting the academic freedom and freedom of expression of all members of the university community. This policy against harassment shall be applied in a manner that protects the academic freedom and freedom of expression of all parties to a complaint. Academic freedom and freedom of expression include, but are not limited to, the expression of ideas, however controversial, in the classroom, in residence halls, and, in keeping with different responsibilities, in workplaces elsewhere in the university community.
- II. Harassment at Duke University is defined as follows:
 - A. The creation of a hostile or intimidating environment, in which verbal or physical conduct, because of its severity and/or persistence, is likely to interfere significantly with an individual's work or education, or affect adversely an individual's living conditions.
 - B. Sexual coercion is a form of harassment with specific distinguishing characteristics. It consists of unwelcome sexual advances, requests for sexual favors, or other verbal or physical conduct of a sexual nature when:
 1. submission to such conduct is made explicitly or implicitly a term or condition of an individual's employment or education; or
 2. submission or rejection of such conduct is used as a basis for employment or educational decisions affecting an individual.
 - C. The conduct alleged to constitute harassment under this policy shall be evaluated from the perspective of a reasonable person similarly situated to the complainant and considering all the circumstances.
- III. In considering a complaint under the Duke University Harassment Policy, the following understandings shall apply:
 - A. Harassment must be distinguished from behavior which, even though unpleasant or disconcerting, may be appropriate to the carrying out of certain instructional, advisory, or supervisory responsibilities.

*This Harassment Policy replaces previous statements on harassment, sexual harassment in employment, and sexual harassment of students. Specifically it replaces Appendix W. of the Faculty Notebook, Policy IX.180 and Policy IX.190 in the Duke University Policy Manual, and the statement on Sexual Harassment of Students in the various school bulletins.

+Applicants for admission or employment who feel that they have been harassed by employees of Duke University, and students and employees of Duke University who feel they have been harassed by persons doing business with the university should report their complaints to the Office of the University Vice-President and Vice-Provost.

- B. In so far as Title VII (Equal Employment Opportunity) of the Civil Rights Act of 1964 is applicable (i.e., in complaints concerning carrying out of noninstructional workplace responsibilities, the university will use the definition of sexual harassment found in the Equal Employment Opportunity Commission (EEOC) Guidelines: "conduct of a sexual nature...when such conduct has the purpose or effect of unreasonably interfering with an individual's work performance or creating an intimidating, hostile, or offensive working environment." The university will use new EEOC guidelines as they are promulgated. The community will be notified if such changes occur.
- C. Instructional responsibilities require appropriate latitude for pedagogical decisions concerning the topics discussed and methods used to draw students into discussion and full participation.
- D. In interactions of students and other members of the Duke community in social and living situations, the university believes it is generally more appropriate to encourage and nurture positive interactions and understanding between complainants and respondents rather than to invite charges of harassment for individual episodes of hostile, disrespectful, or intimidating speech.
- IV. Individuals who believe that they have been harassed in violation of this policy should consult the Duke University Grievance Procedures for Claims of Harassment.
- V. This Harassment Policy and the Grievance Procedures for Claims of Harassment are only part of Duke University's effort to prevent harassment in our community. In addition to offering channels for making and resolving complaints, the university is also committed to programs of education to raise awareness concerning the nature of harassment and ways to prevent harassing behaviors.

Residential Information



Residential Facilities

TRINITY COLLEGE THE SCHOOL OF ENGINEERING

The university adheres to the premise that social regulations and activities of the various living groups must be supportive of the general welfare of the total university community and must be protective of the interests of individuals and minority viewpoints within each living group. Most of these regulations are enforced by the members of the community. In addition to the social regulations formulated by each living group, there are certain policies specified by the university that apply to students living within the residence halls and pertain to the safety and security of students and the orderly functioning of the residence halls. Within the framework of the regulations of the community, individual students are responsible for their own decisions and choices. Any student or group of students may recommend a change in the regulations by presenting a proposal to the Residential Policy Committee, an advisory committee to the Office of Student Development on matters of housing.

The residential facilities of Trinity College and the School of Engineering are available to all full-time single undergraduate students who have been in continuous residence since their matriculation as first-year students as well as to students on leaves of absence or off-campus, provided they have filed the appropriate papers by established deadlines to the assistant dean of housing in the Office of Student Development. Duke University residential facilities include residence halls and Central Campus Apartments. While every undergraduate who matriculates as a first-year student is guaranteed four years of university housing so long as he/she remains a full-time student, he/she may live in university housing for no more than four years. Students who enroll in graduate or professional programs prior to receiving the undergraduate degree (such as "three/two" programs) are not eligible for undergraduate housing during their fifth year.

First-Year-Student Residence Halls. First-year students reside in all first-year student houses, the majority of which are coed, clustered on three of the four residential areas. The housing assignments are made by lottery to the houses. Within the residence halls, single, double, and triple rooms are available.

Upperclass Residence Halls. Upperclass students live in coed and single-sex residence halls on East and West Campuses. There are two types of living groups: independent lottery and selective. The independent lottery living groups have their spaces filled by a general housing lottery. The selective living groups, which include the fraternities, select their members. Included among the selective houses are academically sponsored theme houses such as the Decker Tower Language House; the Mitchell Tower Arts House; the Round Table; and the Anne Firor Scott Women's Studies House. Other selective houses include Spectrum, a multicultural theme house, the Women's Selective House in Cleland, and the ECHO (East Campus Housing Option) located in Epworth on East Campus. All living groups or houses are governed by House Councils elected

by members of the groups. Within all of the upperclass houses, except those located in Edens, there are triple as well as single and double rooms.

Central Campus Apartments. Located on Central Campus is a complex of university owned and operated apartments which accommodates nearly 800 undergraduate students. The remainder of the complex houses a cross-section of students from various schools and colleges of the university. This facility is part of the undergraduate lottery space, and assignment to this space satisfies the university's guarantee to provide eight semesters of housing.

Residential Regulations

(See also Student Life Section for additional information.)

In its residential policies and procedures, Duke University seeks to foster a climate of responsibility, initiative, and creativity on the part of individuals and living groups. A successful residential community is one in which students take pride in their physical surroundings and assume active responsibility for the maintenance of acceptable standards of public behavior in their living areas. Living groups are held accountable for the actions of individual members.

While students are entitled to a general expectation of privacy within the confines of their own individual rooms (although, of course, extraordinary and compelling circumstances may occasionally require that this expectation be institutionally suspended), the university will not regard either students' immediate living quarters or their commons areas as privileged sanctuaries where students may act with absolute impunity and without regard to minimum standards of civility, decency, and respect for the rights of other members of the university community. Moreover, occupancy of an individual room or of a residence hall does not confer any proprietary interest or right of ownership on the part of the living group as a whole. The student and the living group are both properly viewed not as *owners* but as *custodians* of that living space (with all of its physical amenities) which has been assigned to them. Inherent in this custodial relationship, of course, is the right of the university to promulgate criteria governing the circumstances under which this relationship may be entered into, may be maintained in good standing, or may be terminated.

While the majority of problems incurred between or among roommates can be resolved by the students, with or without assistance, there are some cases in which a stalemate occurs. The Office of Student Development will, in those cases, reserve the right to convene an arbitration board to resolve the problem. The decision of the board is final.

Residence Hall's Security Systems. All residence halls are locked twenty-four hours a day. Residents have access by using their DukeCards. Other Duke students have access to all those living groups which have voted such access between the hours of 9:00 A.M. and 2:00 A.M.; otherwise, access is gained by use of telephones which are installed at the front door of each living group. DukeCards are not to be loaned or borrowed.

Signing Out. There is no requirement that a student leave a record of his or her whereabouts if he or she leaves the Duke campus. However, in order that students can be located when needed in an emergency and in the interest of students' safety, it is recommended that students leave records of their whereabouts and anticipated time of return with the residential staff or with roommates when they are out of the residence hall.

Meetings in Residence Halls (use of Residential Lounge Facilities). Lounge facilities are provided within the residence halls for the use of those Duke University students living in the residential unit in which the lounge is located. Use of the lounge must conform to all regulations established by the university and individual units. Permission for students or groups of students who are not members of the residential

unit to use the lounges must be secured in advance from the House Council of the resident unit and should be reported to the service manager. Any use of lounges must be approved and registered with the House Council. The care of the facilities within the lounge areas is the responsibility of the residential unit. Any group given permission to use the lounges is responsible to the residential unit for any damages which might occur as a result of their use of the area. Housing Management will hold the residential unit responsible for damages or necessary cleaning.

Guests. A student may not have guests over the objection of his/her roommate(s). Students may have overnight guests for reasonable periods of time subject to the specified residence hall visitation policies for each residential unit and with the permission of his/her roommate(s). However, continued use of a residence hall room or Central Campus Apartment by person or persons other than those to whom the room or apartment is rented is prohibited. Overnight guests should not be entertained during examination periods. The colleges reserve the right to ask a guest to leave if university policies and residence hall regulations are not obeyed or if complaints are received from members of the resident community. Violation of any of these regulations could lead to nonresidents being charged with trespassing and residents (both guest and host) having their housing licenses revoked.

HOUSING LICENSE

Prior to occupancy of space in a university residence hall or Central Campus Apartment, each student must sign a housing license. Licenses for the residence hall and Central Campus Apartments must be filed with the assistant dean of housing in the Office of Student Development. Refer to the appendices for copies of the residence hall license and the Central Campus housing license.

REVOCATION OF THE HOUSING LICENSE

Residence hall occupancy should be understood as a privilege which is to be maintained under certain standards. This includes abiding by the terms of the housing license as well as upholding general standards of civility, decency, and respect for the rights of other members of the university community.

All terms of the housing license (see Appendix A for copies of the residence hall and Central Campus licenses) are designed to protect the health and safety of students and to provide for the comfort and privacy of students who have contracted to occupy university housing.

Any conduct which reflects a serious disregard for the rights, health, safety, and security of other occupants of university housing will be reason for revocation of this license and/or disciplinary action. Such conduct includes, but is not limited to, tampering with fire and security equipment or use/possession of firearms, weapons (including starter pistols), and explosives (including fireworks). When a license is revoked due to disciplinary action, the university will not refund any portion of the payment for the semester in progress.

In addition to violators of specific housing license terms, a student who has been a repeated violator of housing terms and/or university regulations or who has shown blatant disregard for others is subject to eviction.

HOUSE DUES POLICY

Duke University has a strong commitment to a residential community supportive of a good educational experience. The activities of each residential house which contribute to this experience are possible only through a financial commitment of the members of that house. Therefore, students living within a living group are obliged to pay the dues upon which the residents agree. (It should be noted that the university has taken this obligation into account when determining a student's financial aid package.)

1. It is required that house dues be agreed upon by at least a two-thirds majority vote of the living group membership in a well-announced meeting attended by at least three-fifths of the members or through a poll of all residents. Further, it is understood that this is a private matter between the individual and his/her living group. Each living group is required to set dues to a \$25 per person minimum for each semester.
2. Students who move from one living group to another can expect a prorated refund from their former living group and are expected to pay prorated house dues to the new living group.
3. Students who have accepted membership in a particular living group in which they continue to reside and, at a later time, accept membership in another group shall be obligated to pay dues to both groups unless a written agreement is negotiated with the groups involved.
4. Independents involuntarily placed in fraternity sections, or in independent selective living groups, or fraternity men involuntarily placed in independent sections are not obligated to pay house dues. They may choose to pay social dues if invited to do so by the fraternity or the independent house; however, they are obligated to pay a small annual fee (\$10 per semester) if they use the commons room and television.
5. Should a selective living group be unable to fill its assigned space with its members, up to 10 percent of the space (with approval of the Office of Student Development) may be allocated to "affiliate" members who have a contractual financial arrangement with the selective group. Such persons have full social privileges within the selective group and are often referred to as "friends of the house."

ASSISTANCE FOR LIVING GROUPS IN COLLECTING DUES

The Office of Student Development will assist in collecting dues *only if* house treasurers submit to that office a list of those delinquent in payment along with their P.O. Box numbers by October 7 for first semester dues and February 10 for second semester dues along with a statement indicating that portion of dues which is used to buy alcohol (the Office of Student Development will not assist in the collection of living group dues which are used to purchase alcohol). In order to have the assistance of that office in collecting dues, house treasurers *must* attend the Student Affairs Workshop for house treasurers during the fall semester. Also, there must be a statement that the treasurer has personally contacted all students delinquent in paying dues.

Appeals. Every house must make available to all students the option of appealing in-house for a waiver of dues. It is recommended that appeals be heard in a closed meeting of the appellant and the house treasurer (and, perhaps, house president) with the resident adviser as observer and adviser. The contents and decision of such appeals are to be held in the strictest confidence. When a waiver is granted, it may be assumed, unless otherwise specified in the decision, that the appellant retains all social privileges in the house. The hearing panel may recommend full payment, installment payment, or nonpayment. All students must pay a fair-share portion of the damage fees. Decisions of the hearing panel may be appealed to the appropriate judicial body.

N.B. Joining a fraternity or a sorority, participating in other organizations, taking no interest in activities of the living group, or deciding to spend one's discretionary funds in another way do not constitute valid grounds for exemption from paying dues.

Sanctions. Students failing to pay living group dues which have been properly established and whose names have been reported to the Office of Student Development by October 7 (fall) and/or February 10 (spring) will be subject to the following:

1. Graduating seniors and undergraduates who are continuing as students but are not planning to live in university housing will be referred for disciplinary action to the appropriate judicial body.
2. All other students will have their housing privileges revoked for the remainder of their undergraduate careers.

LIVING OFF-CAMPUS

Students above the first-year student level who wish to live off campus should file the appropriate forms with the housing coordinator.

If a student plans to live off campus and return to university housing at a later time, he/she *must* request by the deadlines published by the Office of Student Development that his/her housing deposit be held up to one calendar year, after which it would be refunded and the housing guarantee revoked. Such requests should be made by completing the appropriate form in the Office of the Assistant Dean of Housing in the Office of Student Development.

POLICY FOR REFUND OF RESIDENTIAL DEPOSITS, BOARD PAYMENTS, AND RENTS FOR STUDENTS IN UNIVERSITY HOUSING

Residential Deposits. The one hundred dollar (\$100) residential deposit paid upon matriculation to Duke will be refunded if the Office of Student Development is notified by the currently enrolled student prior to July 1 of his or her intent to move out of university housing for the fall semester and by December 1 if cancelling for the spring semester.

Move from Residence Halls to Central Campus Apartments. Students who move from the residence halls to Central Campus Apartments will have their room rent payment credited to the Central Campus Apartment rent and will receive full refund of unused board payment (unused points) if the board contract is terminated at the time of the residence hall cancellation. Students also have the option of maintaining or changing the board contract at this time.

Cancelling a Central Campus or Residence Hall Assignment. Undergraduate students in Central Campus who wish to move off campus, to move to the residence halls, to take a leave of absence, or to withdraw from the university should contact the Office of Student Development to request cancellation of the contract. Request for cancellation due to a leave of absence or withdrawal from the university will be granted. A request for cancellation to move off campus or to the residence halls will be granted only if an eligible replacement (eligibility is determined by the Office of Student Development) is found to move into the space created by the cancellation. If a student has been released from the housing license by the assistant dean of housing and is eligible for a refund of unused rent, the amount will be determined by the date of written notification or the date of vacating the apartment, whichever is later.

Undergraduate students assigned space in the residence halls who wish to cancel their assignments must notify the Office of Student Development in writing. Students who cancel their assignments after the contract has begun will be entitled to a refund of the unused rent, the amount to be determined according to the date the keys are returned to the service office and/or the date Housing Management inspects the room and confirms that the space has been vacated. Refunds of unused board payment (unused points) will be given if the board contract is terminated at the time of room cancellation.

PRIVACY OF STUDENT'S ROOMS AND APARTMENTS

Students who reside in university residences are assured the privacy of their rooms and apartments and freedom from the admission into or search of their rooms or apartments by any unauthorized persons; however, the university is obligated to maintain reasonable surveillance of the residential areas to promote an environment

consistent with the aims of an academic community. To foster these conditions the following regulations are now in effect:

1. Housing Management personnel may enter assigned rooms or apartments at reasonable hours on days designated by either bulletin board notices or similar prior notification for the purpose of carrying out their assigned tasks and functions. Other personnel may enter assigned rooms when accompanied by proper authorization from the appropriate administrative official (see section 2 (c) below). In the case of residence halls, this notification, when feasible, shall be posted on the residence hall bulletin board stating what dates rooms will be entered. Maintenance personnel may enter assigned rooms or apartments at reasonable hours for the purpose of carrying out their assigned tasks and functions. Housing Management personnel attempt to inspect the maintenance work done within twelve (12) working days to validate satisfactory completion of such work. Employees in the above categories may report on the condition of university facilities and equipment, on violations of the housing license, or on situations which jeopardize the overall health and safety of the resident population. All personnel in the above category shall leave written notice stating the purpose for entering. Upon receipt of this notice the occupant may contact the area Service Office to discuss the entry. The written notices must, as well, advise the occupant that subsequent investigation or repair may henceforth occur at any time during the normal work week of Housing Management or maintenance personnel. (Note: General rule or enforcement procedures will not be founded on information relating to the personal contents of rooms from personnel mentioned unless such contents are specifically prohibited by university regulations or by the housing license published in advance.)
2. No person, with the exception of those listed in section 1 above, shall enter assigned rooms or apartments except under the following conditions:
 - a. consent of the occupant(s); or
 - b. presentation of a properly drawn legal search warrant; or
 - c. authorization from the Office of Student Development; or
 - d. emergency situations or immediate threat to preservation of the building and the safety of occupant(s) and/or the residential population.
3. Reports made as a result of inspections related to physical facilities and/or furnishings will be handled by the Department of Housing Management in accordance with the existing residential regulations as published in bulletin form by the university.
4. Written authorization from the deans must specify the reasons for believing such a search is necessary, the objects sought, and the area to be searched.
5. The request for a search, if approved by the designated authorities, shall be kept in records with the authorization until the time of the student's graduation and shall be available to the student for examination. The records will be kept completely separate from the student's permanent record. Should the search figure in any trial proceeding within the university, the authorization shall be attached to the trial record; if no action is taken following an authorized search, notation of this fact shall be filed with the authorization. No action shall be taken in regards to objects found but not specified on the authorization of the search.

In the absence of a legally drawn search warrant, no general searches shall be conducted by university personnel except with the possession of the written authorization of all these above-mentioned deans, stating the reasons for the search and the specified objects sought, or under circumstances deemed to be of extreme emergency by these deans or the officer on each campus in charge of maintenance.

CARE OF STUDENT RESIDENCES AND ADJACENT CAMPUS AREAS

Though limited custodial services for common use areas are available, a student is responsible for the care of his or her room or apartment and furnishings and is required, as a condition of occupancy, to keep the room or apartment reasonably clean and orderly. The university reserves the right for personnel to enter at reasonable hours to inspect the condition of any student's room or apartment in accordance with the current privacy policy.

Nails, screws, tacks, or adhesives on any walls or woodwork of the residence are prohibited. The utilities, wiring, locks, or screens should not be altered in any way. (See Housing License for more detailed information.)

Games and other activities which may damage lawns or shrubbery adjacent to residence halls or apartments are not permitted. Defacing or painting buildings and adjacent installations, sidewalks, trees, and shrubbery is prohibited.

No student shall enter custodial, utility, or maintenance spaces within the residence halls or apartments unless accompanied by university-authorized custodial or maintenance personnel. Use of roof areas is prohibited.

Complaints and requests pertaining to maintenance and services should be reported to the Service Office in the appropriate residential area.

Housekeeping services such as cleaning the bathroom, sweeping, mopping, vacuuming, and trash removal will be provided on weekdays during the academic year (excluding holidays) in common areas of the residence halls. Cleaning of individual rooms or apartments is the responsibility of the resident(s).

Living groups are expected to take responsibility for cleaning up after parties and other events that create extraordinary messes. Any extraordinary cleaning that must be performed may be charged to the living groups. Inasmuch as housekeeping time spent on extraordinary clean-up is time spent away from the normal duties of keeping the buildings clean, extraordinary clean-up may be deferred until such time as the normal housekeeping tasks are complete. Extraordinary cleaning is generally defined as clean-up of (1) excessive trash, (2) conditions that present hazards to people, furnishings, or buildings, such as broken glass, standing liquids, flammable trash and health hazards, and (3) other conditions that require unusual effort, such as removal of eggs, shaving cream, etc. A cleaning supplies closet has been designated for each living group's use. Members of the living group have 24-hour access to and responsibility for the cleaning equipment provided by Housing Management. Each closet contains a mop, mop bucket, broom, dustpan, soap, toilet tissue, Barf Clean, and trash bags.

All living groups are responsible for cleaning trash beyond the normal amount on the grounds adjacent to their residence halls. Failure to have the grounds cleaned after an event will result in a minimum charge of \$25 to be determined by the Facilities Management Department.

Extra trash containers are available from the Facilities Management Department by calling 684-3611 at least two days prior to the event.

Damage Policy. Students will be held responsible for damages that occur in their rooms and apartments. Living groups will be charged for damage to public areas of the houses. Students and living groups will be billed and may appeal charges in accordance with procedures published by the Department of Housing Management. (See the housing licenses and handbooks for information. Additional information may be obtained from the Department of Housing Management.) Living groups similarly will be charged for damage to public areas, equipment and furnishings, buildings, sidewalks, shrubbery, and lawns; repair costs will be billed to the students in accordance with procedures established by the university after consultation with the Residential Policy Committee. Damage to the residence halls which costs less than \$50 is not charged to the living group. (See below for the exceptions of excessive cleaning of commons areas.) At the end of each academic year, outstanding living group charges will be divided

equally among the group's members and charged to their bursar's accounts. Littering which causes excess work to clean will be charged to the students and living groups involved.

STORAGE

During the academic year, Housing Management provides storage for empty trunks and luggage without charge in the area designated for each residence hall. Students should consult their service offices for information. All items placed in storage for the academic year must be removed prior to the last day of final examinations for the spring semester. Nonstudents and students residing off-campus may not store personal effects at any time in the residence hall storage rooms. Items placed in storage must have a Housing Management storage tag and be well marked with owner's name tag and permanent mailing address. Receipts given at time of acceptance must be surrendered by the student on withdrawal of storage items. Items left in storage rooms at the end of the spring term for which summer storage fees have not been paid will be disposed of in the best interest of the university. Storage in Central Campus Apartments is available for a fee to qualifying residents. No free storage is available.

The Department of Housing Management provides space for storage of personal or group-owned items during the summer months on a fee paid basis and in approved areas only. Any personal effects or group-owned items left in the residence halls not in approved storage areas (including, but not limited to, commons rooms, closets, and above suspended ceilings) may be disposed of without notice or reimbursement to the owner. Designated closets have been made available to some living groups for storage of group-owned items such as file cabinets, party supplies, and fraternal material. These closets may not be used by members of the living groups for storage of personal possessions. Housing Management is not liable for damage to or loss of stored living group items except as the fee paid storage terms allow.

LIVING GROUP BUILDING IMPROVEMENTS AND RENOVATIONS POLICY

Alterations and/or renovations to residence halls by living groups must be approved by the director of Housing Management. Any living group wishing to make permanent or attached alterations, additions, or renovations to residence halls commons areas must submit plans, drawings, and other related information to the director of Housing Management for evaluation.

If approved, such alterations, additions, or renovations will be accomplished at the living group's expense. Housing Management will inspect the completed work to make sure approved materials and plans were used and that the quality of construction is acceptable. Any construction which does not pass inspection must be removed or corrected as directed by Housing Management and at the living group's expense.

Any changes of a permanent or attached nature not approved through official channels may be removed at the convenience of the university and subsequent repairs made at the group's expense.

Living groups may make nonattached additions to commons areas during the academic year without specific approval from Housing Management so long as certain conditions are met. Examples of nonattached additions include, but are not limited to, bars, pool tables, ping-pong tables, stereos, speakers, refrigerators, furniture, etc. Non-attached additions must be portable, functional, in good repair, nondamaging to the building, noninterfering with routine housekeeping/maintenance, and may not present any safety or health hazard.

During the academic year, should nonattached living group property fail to meet these conditions, Housing Management will notify the living group of its noncompliance and request that the living group take corrective action by a specified deadline. If the problem requires immediate attention or the living group fails to make the correction by the deadline, Housing Management will take whatever action it deems necessary to

eliminate the problem and the living group will be charged accordingly. Housing Management assumes no responsibility for damage to, or loss of, living group owned property.

ALL NONATTACHED LIVING GROUP OWNED ADDITIONS MUST BE REMOVED BY THE LIVING GROUPS AT THE END OF EACH ACADEMIC YEAR. All nonattached living group property left in the residence halls commons areas after May move-out will be considered abandoned and will be disposed of at the expense of the living group and without liability by the university. No attempt will be made to contact living group members to determine ownership or disposition of the property.

Living groups are encouraged to seek their service manager's advice when considering nonattached additions.

EXTERIOR SIGN POLICY FOR RESIDENCE HALLS

Exterior building signs identifying a living group will be permitted only in the immediate area of the residence. The sign must be provided by the group and approved jointly by the director of Housing Management and the dean of students. Only one sign per living group is allowed. Where two or more signs currently exist, any above the one allowed will need to be removed after reaching a point of disrepair.

All such signs will be mounted on the buildings by Housing Management at no cost to the group. Requests for sign approval and mounting should be made in writing to the director of Housing Management and must include a sketch of the proposed sign, indicating proposed dimensions and colors, in ample time for approval before beginning to build the sign. Any repairs to existing signs must be approved by the director of Housing Management.

RESIDENCE HALL BENCH POLICY

Only approved living groups may place benches on university property. Benches will be permitted only in the area immediately adjacent to a particular residence unit. The bench may be put in place by the living group as long as the dimensions are no larger than 12' *in length*, and 5' *in height* from the ground, and 6' *in depth*. Benches may not be cemented in the ground. If existing benches cemented into the ground must be moved for any reason, they will be cut off at ground level and not replaced in concrete by the university. Any bench too large to move in one piece will be separated into manageable pieces and reassembled using existing lumber without reimbursement to the living group for damages. Every effort will be made to retain the integrity of each bench when it is necessary to move a bench; however, the university will not be responsible for repairing benches damaged as a result of a move. Living group benches may have to be moved temporarily (e.g., for Commencement or summer programming). The specific design, including sketches noting dimensions, and desired location of a living group's bench must be submitted in writing to the dean of students at least three weeks prior to the desired construction date. Approval for a bench must be received from the dean of students and the university safety officer. All wooden benches must be sprayed with a chemical flame retardant by the Safety Office prior to their being painted.

Annual Review of Residential Groups

The following statement of residential group standards and annual review is based on one initially drawn up by the Residential Life Committee to provide a mechanism for the continued improvement and support of the residential living group system.

The specific terms of this program are as follows:

1. Before the end of spring semester, each upperclass living group must file in the Office of Student Development the following information:

- a. a constitution of the governmental structure of the group
 - b. a statement of the goals, standards, and proposed contributions to the residential program
 - c. a list of activities through which its members attempted to accomplish its stated goals in the current year
 - d. an outline of proposed activities for the following year
2. Early in the fall semester, the Office of Student Development will submit each living group's Annual Review Report to a special committee which the dean, or designee, will convene initially and which will be composed of the following:
- a. an *ex officio* representative of the Office of Student Development who will chair the group
 - b. the president of DSG or a representative
 - c. the president of IFC or a representative
 - d. the president of UHA or a representative
 - e. the chairperson of the Undergraduate Judicial Board or a representative
 - f. two faculty members appointed by the dean of students, one each from Trinity College and the School of Engineering
 - g. an academic dean appointed by the dean of Trinity College
 - h. a representative from the Office of Student Development

This committee will review and evaluate the program of each living group, examining in particular the following:

- a. attainment of stated goals
- b. quality of group's program (educational/cultural, social, and charitable)
- c. disciplinary record
- d. damage record
- e. active participation in the living group's representative organization (IFC, UHA, or the Council of First-year Presidents).

The committee will then submit the results of its evaluation to the dean of students. After the dean reviews the recommendations of the committee, the living group presidents will be notified whether the group's program was determined to be outstanding, satisfactory, in need of improvement, or unsatisfactory.

3. Presidents of the groups in need of improvement may be asked to meet with the committee chairman, or designee, and, when possible, another staff member of the Office of Student Development. The purpose of this meeting is to offer suggestions for correcting deficiencies in the overall program of the living group. Following the meeting and through the spring semester, the living group will be expected to correct the program deficiencies identified by the committee. The following fall, the committee will review the program of the groups to ascertain whether the deficiencies are still present. If the committee finds insufficient improvement in a group's program, it may recommend that the group appear before a dissolution hearing panel.
4. Groups with an unsatisfactory program or with no report may be referred to the appropriate administrator for a possible dissolution hearing.

A similar review process is implemented for the first-year student houses in the spring semester.

Residential Group Accountability for Community Standards

Living groups are responsible for maintaining standards established by Duke University. If such standards are not maintained, the appropriate office in student affairs may call a hearing panel to determine whether a living group should be dissolved. The panel shall report its recommendation to the administration of the appropriate office in the student affairs division. It shall be the decision of the administrator as to whether a living group is dissolved. That decision may be appealed to the vice-president for student affairs. The vice-president's decision shall be final and binding.

The final decision regarding the continuation of a living group rests solely with Duke University.

Living groups may also be placed on the status of "warning," "probation," "interim suspension," or "suspension" by the administrator of the appropriate office in the student affairs division.

Housing Policies for Selective Living Groups and Their Members

The following housing policies for selective living groups are gathered together from the February 26, 1981 Report of the Student Affairs Trustee Committee in response to the residential life section of *Directions for Progress; "Social Fraternal Organizations Policies and Procedures, Duke University, July 1, 1979;"* and *"Residential Life: Policies and Procedures for Undergraduate Students, 1985-86."*

Duke University will not recognize or charter a new fraternity unless there is adequate space to house the members as a living group.

In accordance with the guidelines adopted by the trustees in 1981, there is to be no greater number of fraternity living groups chartered. Furthermore, there is a 50 percent ceiling on the number of upperclass bed spaces on campus allocated to men and women's selective living groups (the number of selective bed spaces for men would be no more than 50 percent of the upperclass men's spaces on campus). Contact the Office of Student Development for further information.

POLICIES REGARDING SPACE ALLOCATED TO AND FILLED BY FRATERNITY LIVING GROUPS

1. All fraternities are expected to fill 100 percent of their sections' bed spaces with initiated members of the fraternity ("brothers"). N.B. Only initiated brothers count toward fulfillment of this housing obligation; "friends of the house" (see 2b. below) and pledges do not count toward fulfillment of this obligation.
2. If a fraternity fails to fill 100 percent of its section's bed space with initiated members, but does fill 90 percent or more of its bed space with initiated members, the following rules apply:
 - a. the Office of Student Development may elect to use any open spaces to house fraternity men from other fraternities;
 - b. if the Office of Student Development does not elect to house fraternity men of its choosing to fill the unoccupied spaces, the fraternity may fill its unoccupied spaces with "friends of the house;" i.e., independent men who, upon mutual agreement with the fraternity, choose to live in the fraternity section, pay the dues required of them by the fraternity, and have social privileges within that selected group.
3. If a fraternity fails to fill 90 percent of its section's bed space with initiated members of the fraternity, a panel may be convened (see Residential Group Accountability for Community Standards) to review:

- a. the fraternity's continued presence in its current section and the question of relocation to a smaller section;
 - b. the fraternity's continued presence in any university housing and the question of placing the fraternity in nonresidential status; or
 - c. the fraternity's continued recognition as a living group and the question of revocation of the fraternity's charter.
4. Should the number of members exceed the space in the allocated section, the excess members (to be determined by the living group) would find it necessary to be assigned space in another fraternity section which has available space, to move to proportionately allocated Central Campus Apartment space, or to move off campus.
 5. Each selective living group is required to submit to the assistant dean of housing in the Office of Student Development before November 15 (for spring semester) and February 8 (for fall semester) a list of eligible initiated members who will be living in the section for the following semester.

POLICIES REGARDING WHERE MEMBERS OF FRATERNITY LIVING GROUPS MAY RESIDE

1. Members of a fraternity living group may reside only in the section of residence halls allocated to their group unless the number of members exceeds the space. They also may reside in the theme houses.
2. Any members unable to live in their section because their living groups have more members than beds, must either be assigned space in another fraternity with available space, must move to proportionately allocated Central Campus Apartments, or must move off campus. Those students moving off campus have the option of retaining their residential status if they arrange with the assistant dean of housing in the Office of Student Development to have their housing deposits held for reinstatement in housing when space within the living group becomes available.

POLICIES REGARDING SPACE ALLOCATED TO AND FILLED BY INDEPENDENT SELECTIVE LIVING GROUPS

1. All independent selective living groups are expected to fill 100 percent of their sections' bed spaces with members whom they select.
2. If the group fails to fill 100 percent of its section's bed spaces with members, the Office of Student Development may, at its discretion, use the open spaces to house other students.
3. If the group fails to fill 90 percent of its section's beds spaces with members:
 - a. the Office of Student Development may, at its discretion, permanently reallocate any or all empty spaces to other students
 - b. a hearing panel may be convened (see Residential Group Accountability for Community Standards, p. 36) to review:
 - i. the living group's continued presence in its current section and the question of relocation to a smaller section;
 - ii. the question of whether or not to change the selective living group to nonselective status by which students are then assigned to the section by the Office of Student Development.
 - iii. the question of whether or not to desolve the collective living group.
4. Each selective living group is required to submit to the housing coordinator in the Office of Student Development before November 15 (for spring semester) and March 8 (for fall semester) a list of eligible members who will be living in the section the following semester.

GUIDELINES FOR INDEPENDENT SELECTIVE HOUSES

1. (a) New selectees for selective houses should be bound for a minimum two-year commitment.
(b) Residents who break the two-year minimum commitment to the house to reenter the lottery be relegated to the very bottom of the lottery, after sophomores.
(c) Semesters taken “on leave of absence” or study programs away from Duke’s Durham campus will not be considered in violation of the two-year commitment and will be counted as part of the two-year commitment.
2. As with other selective houses (i.e., fraternities), independent selective houses will be required to fill 90 percent of their bed space.
3. Independent selective living groups should adopt and maintain at least one charity, volunteer commitment or service project that is uniquely their own.
4. Independent selective living groups should run a satisfactory level of cultural and educational programs each semester.
5. Independent selective houses should maintain strong intramural sports and social programs, and whenever possible, look to interact with different groups on campus.
6. All independent selective (and for that matter commitment houses) must maintain their status as active members of the UHA.
7. Independent selective houses should choose a member of the Duke faculty or administration who agrees to serve as the dorm’s advisor.
8. If, after review, a selective living group terminates a student’s membership in the house, then that student may reenter the regular lottery without penalty. Review and any terminations are to be completed no later than February 15, to facilitate the Housing Office’s administration of the spring lottery.

GUIDELINES FOR INDEPENDENT SELECTIVE HOUSES WITH ACADEMIC SPONSORS: THEME HOUSES

1. Adherence to the Guidelines for Independent Selective Houses except for the minimum two-year commitment.
2. Adherence to housing deadlines, policies, and procedures as published in the *Bulletin of Information and Regulations*, as decided by the Residential Policy Committee, and as outlined in the publication *Residential Life: Housing Assignment Policies and Procedures for Undergraduate Students*.
3. Adherence to the Annual Review Committee policies and guidelines (see page 35).
4. Some component of the academic program of the living group must take place in the residence hall; e.g., house courses, colloquia, faculty / student receptions, etc.
5. Some educational programming sponsored by the living group must be open to the entire community.
6. The programming conducted in the residence hall should be supported by the living group member dues as well as by financial contributions from the academic department sponsors and the residential life programming fund.
7. Resident advisors will be required and will be selected through normal procedures with input from the academic sponsors.
8. Sponsors of the program must clearly state in the application materials their expectations and requirements of the students.
9. The academic department(s) sponsoring the group must identify a faculty member to serve as advisor to the group.

Student Life



Duke University expects and requires of all its students full cooperation in developing high standards of scholarship and conduct. Each student is subject to the rules and regulations of the university as currently in effect or, from time to time, are put into effect by the appropriate authorities of the university.

Any student, in accepting admission, indicates his/her willingness to subscribe to and be governed by these rules and regulations and acknowledges the right of the university to take such disciplinary action, including suspension or expulsion, for failure to abide by the regulations or for other conduct adjudged unsatisfactory or detrimental to the university.

Responsibility for prescribing and enforcing rules and regulations governing student conduct rests ultimately with the Board of Trustees of Duke University, and, by delegation, with administrative officers of the university and of the school and college. In the undergraduate college and school, as well as in the university as a whole, many of these rules have been established over the years by cooperative action between students and administrative officers, and in the case of some rules, with participation of faculty members as well. Representative student organizations, such as student governments and judicial boards, and more recently, community-wide bodies of students, faculty, and administrators, have initiated academic and nonacademic conduct; and these proposals have been accepted by colleges and university officers and have become a substantial, if not all-inclusive, body of rules governing student life at Duke.

Similarly, the enforcement of rules in the undergraduate school and college has traditionally been a cooperative endeavor of students and administrative officers, as well as faculty members who have participated in review and appeals committees and have advised with college and university officers about appropriate standards and procedures in such matters. The judicial structure of the university consists of the University Judicial Board and a judicial board for each of the communities within the university.

The judicial structure formalizes the tradition of shared participation by various members of the university and college community. Its viability, however, is dependent upon a mutual recognition by all members of the community of the need for high standards of scholarship and conduct, a willingness to exercise the personal and corporate responsibilities that accompany such recognition, and an appreciation of the different roles and responsibilities played by various members who participate in the life of the community. This last factor relates particularly to the role of students in determining and supporting high standards. In addition to the agreed upon monitoring and enforcement procedures outlined, the university administration reserves the right to intervene as needed.

If you have any questions concerning university regulations, the judicial structure or procedure, contact Vice-President Janet Smith Dickerson (684-3737), 106 Flowers, Dean Karen Steinour or Dean Paul Bumbalough (684-6313), Crowell Building, East Campus.

The Undergraduate Community

Students in Trinity College and the School of Engineering constitute an undergraduate community whose members are subject to the Undergraduate Community Code. Violations of the code and certain university regulations are adjudicated before the Undergraduate Judicial Board, composed of representatives of the student body, the faculty, and the administration. The constitution of the board and the procedural

safeguards and rights of appeal guaranteed to students are set forth in Appendix C. Also provided is an alternative procedure for hearing cases by a dean or administrative panel from the student affairs staff, as well as an appeal procedure. The judicial code which follows was drafted and approved by the Judicial Review Committee during the spring semester, 1980 and amended during the spring semesters, 1982, 1983, and 1988.

Supremacy of State and National Law. On November 21, 1852, the General Assembly of North Carolina amended an act to incorporate Union Institute in order to create a Board of Trustees in perpetuity for Normal College then located in Randolph County. The amended act provided that the trustees could grant degrees and "do all other things for an institution of learning not inconsistent with the laws of this State and of the United States." The act was subsequently amended in 1859 to permit a change in the institution's name to Trinity College and again in 1924 when Duke University was established.

Since 1852 the Trustees of Duke University and their predecessors have been legally empowered to act "not inconsistent with the laws of this State and of the United States." Thus, to this date all officers of Duke University and those to whom their powers may be formally delegated are bound by laws of North Carolina and those of the United States.

The university is not an island. Students, faculty, administrators, and trustees alike are subject to state and federal laws. Acceptance of admission to any of the undergraduate schools or colleges of this university carries with it the assumption of a sense of responsibility for the welfare of the community. Also assumed are obligations on the part of each individual to respect the rights of others, to protect the university as a forum for the free expression of ideas, and to obey the laws of the state and nation.

Acts in violation of North Carolina and United States law are necessarily in violation of the Undergraduate Judicial Code. Such acts when committed on university premises are within the cognizance of the Undergraduate Judicial Board unless otherwise expected. When committed off the university premises they may fall within the board's jurisdiction if constituting a direct or indirect threat to the university community whether or not the offense results in action by a regular civil or criminal court.

Proceedings under the Judicial Code of the Undergraduate Community before, during, or after any which may occur in the regular state or federal courts do not subject a student to "double jeopardy" because such jeopardy arises only in criminal law proceedings. Governments alone, not the university, enforce the criminal law. Action by the board or other university agencies enforce the terms under which a student has accepted admission to Duke University and all sanctions imposed relate to a student's status at the university.

The Judicial Code of the Undergraduate Community. Although the laws of North Carolina and the United States are incorporated in the Judicial Code, enumerated below and included in the following section on university regulations and policies are common infractions lying within the jurisdiction of the Undergraduate Judicial Board. Conduct in violation of the code is punishable by sanctions contained in Appendix C, Art. IV (K) of this bulletin.

I. Academic Dishonesty

A. Plagiarism: Expropriation of words, phrases, or ideas of another without attribution for the benefit of one who engages in the act of expropriation. (See "Use and Acknowledgement of Sources" in this bulletin.)

B. Cheating:

1. Obtaining access, without the instructor's permission, to an examination question or questions prior to the instructor's distribution of the examination.
2. Copying or attempting to copy during an examination from another's work in progress or completed, handwritten, typed, or published without consent of the instructor.

3. Without the instructor's permission, collaborating with another, knowingly assisting another or knowingly receiving the assistance of another in writing an examination or in satisfying any other course requirement(s).
 4. Committing fraud on a record, report, paper, examination, or other course requirement to be submitted to or in the possession of an instructor.
 5. Submission of multiple copies of the same or nearly similar papers without prior approval of the several instructors involved.
- C. Academic Contempt: In the satisfaction of any course requirement, failure to adhere to an instructor's specific directions with respect to the terms of academic integrity or academic honesty for that course requirement.
- II. Assault and/or Battery
- A. Battery: Any use of physical force against a person without his or her consent.
- B. Assault: Any threat of the immediate use of any degree of unauthorized physical force or an attempt to use such force which threatens or actual attempt gives rise to a reasonable apprehension of force against the person threatened as perceived by that person. (See also "University Regulations and Policies: Harassment and Hazing" in this bulletin.)
- C. Sexual Assault
1. Sexual Assault I. By stranger or acquaintance, rape, forcible sodomy, forcible sexual penetration, however slight, of another person's anal or genital opening with any object. These acts must be committed either by force, threat, intimidation or through the use of the victim's mental or physical helplessness of which the accused was aware or should have been aware.
 2. Sexual Assault II. By stranger or acquaintance, the touch of an unwilling person's intimate parts (defined as genitalia, groin, breast, or buttocks, or clothing covering them) or forcing an unwilling person to touch another's intimate parts. These acts must be committed either by force, threat, intimidation or through the use of the victim's mental or physical helplessness of which the accused was aware or should have been aware.
- III. Taking, Converting, and Selling
- A. Theft: Any wrongful physical taking and carrying away of the personal property of another without the rightful owner's consent with an intention to deprive the owner of its use.
- B. Larceny: Any wrongful physical taking and carrying away of the personal property of another without the rightful owner's consent and with an intention to convert it to the use of the taker and into the taker's own property or to convert it to the use of and ownership of a third party.
- C. Embezzlement: Fraudulent conversion of another's personal property by one to whom the owner trusted it.
- D. Fencing: Knowingly receiving or concealing stolen property.
- IV. Property Damage: Any damage to real or personal property owned by others including that owned by Duke University, especially fire equipment, as well as that owned by members of the university community and by visitors to the university. (See "University Regulations and Policies: Fire Equipment" in this bulletin and "Care of Dormitory Rooms and Adjacent Campus Areas.")
- V. Breaking and/or Entry
- A. Breaking: Any bodily action or attempt by means of such bodily action intended to create an opening for access to real or personal property without consent of the owner of such property.
- B. Entry: Any physical bodily presence within real or personal property without consent of the owner. Such illegal entry includes trespass on unauthor-

ized areas. (See "University Regulations and Policies: Roof and Ledge Areas, Unauthorized Access.")

VI. Disorderly Conduct

- A. Any action, committed without justification or excuse, that unreasonably disrupts the normal public use of public areas, or that substantially disturbs the peace and order of the university community. (See "University Regulations and Policies: Alcoholic Beverages" and "Noise.")
- B. Any grossly unreasonable and reckless conduct in the handling of things or substances ordinarily regarded as inherently dangerous or capable of becoming dangerous to other persons or to their real or personal property.

VII. Fraud

- A. Any intentional misrepresentation of fact in an attempt to induce another to surrender a right or property or to authorize the conferring of a benefit in reliance upon the misrepresentation.
- B. Forgery or alteration of documents, including course examinations, papers, or other required exercises, in an attempt to obtain a right or benefit or property.
- C. Obtaining a right or benefit or property under false pretenses.
- D. Unauthorized misuse of otherwise valid documents.

VIII. Bribery: Corruption of another for personal gain.

IX.

- A. Preparation: Devising or arranging means or measures necessary for commission of a prohibited act.
- B. Attempt: Attempting any unlawful act specified in this code by undertaking the intended action.

X. Contempt

- A. Failure to comply with direction, orders, or commands of any university judicial or police authority, or any academic or administrative official of the university acting in an official capacity. (See "University Regulations and Policies: Library Control Desk Inspections" in this bulletin.)
- B. Knowingly furnishing false information to any such authority or official of the university acting in an official capacity.

XI. Illegal Possession

- A. Any transporting to or storing on the campus or possession of firearms, weapons, explosives, mace, or fireworks. (See "University Regulations and Policies: Fireworks, Other Explosives and Weapons" in this bulletin.)
- B. Any violations of the university's alcohol or drug policy.

XII. Accessory to Commission of a Prohibited Act: Aiding or abetting or otherwise acting as an accomplice to commission of any prohibited act.

University Regulations and Policies

Students should be familiar with the Judicial Code of the Undergraduate Community and with the following regulations and policies of the university. Violations are matters which are subject to adjudication before the Undergraduate Judicial Board.

DUKE UNIVERSITY REGULATIONS REGARDING ALCOHOLIC BEVERAGES AND EVENT REGISTRATION

INTRODUCTION

Duke University students and employees are our most valuable resource, and their health, safety, and well being are extremely important. Officials of Duke University recognize

that alcohol abuse can lead to major health problems. In addition, the safety and security of students may be jeopardized by incidents involving alcohol. These university-wide regulations are premised on the belief that Duke students are mature individuals, capable and willing to follow and to enforce the provisions of these regulations, with assistance from the dean of Student Development and Public Safety. Failure to follow these regulations will result in the university taking appropriate action.

This policy specifically governs the distribution of alcohol on the campus of Duke University. However, students who reside off-campus or participate in off-campus events are nonetheless members of the university community. As such, it is expected that students will uphold the same high standard of citizenship and conduct in the larger community as is expected on the campus. With this in mind, in addition to the monitoring and enforcement procedures outlined in this document, the university reserves the right to respond to instances, on or off the campus, where members of the university community have placed in jeopardy the well-being of others.

There are seven components of the policy regarding the use and distribution of alcohol. These are: North Carolina law; registration; event parameters/hours of distribution; monitoring system; alternative beverages and food; health and safety intervention; and enforcement. The regulation details within each component area of the alcohol policy are provided below.

It is important that university community members understand that additional policy details could have been developed to address questions designed to uncover possible loopholes inherent in the policy. Instead, the focus of this policy is on the key elements that, if followed in word and spirit, will result in responsible drinking among those who are of legal age to consume alcohol and in a more positive environment in which students can socialize. The dean of Student Development or her designee(s) reserves the right to interpret the spirit of the policy in cases that require additional policy interpretation. Further, an Alcohol Regulations Review Committee will be established to assist periodically in the interpretation of the policy and in the evaluation of its effectiveness. Committee membership shall comprise representatives from the Duke Student Government, the Interfraternity Council, the Panhellenic Council, the Office of Student Development, the Office of Student Affairs, Student Health, and the Upperclass House Association. If there are questions concerning any aspect of this policy, individuals may address them to the Office of Student Development by telephone.

NORTH CAROLINA LAW

University officials expect that each member of the university community will abide by North Carolina law governing the use of alcohol. A summary of Article 3 of the statute follows:

Sale to or Purchase by Underage Persons

1. Sale
 - a. It is against the law to sell or give beer or wine to anyone less than 21 years old.
 - b. It is against the law to sell or give liquor or mixed beverages to anyone less than 21 years old.
2. Purchase or Possession
 - a. It is against the law for a person less than 21 years old to purchase or possess beer or wine.
 - b. It is against the law for a person less than 21 years old to purchase or possess liquor or mixed beverages.
3. Aider and Abettor
 - a. Any person less than 21 years old who aids or abets another in violation of the above regulations shall be guilty of a misdemeanor, punishable by a fine of up to \$500 or imprisonment for up to six months, or both.

- b. Any person over 21 years of age or older who aids and abets another in violation of the above regulations shall be guilty of a misdemeanor, punishable by a fine of up to \$2,000 or imprisonment for up to two years, or both.
4. It is unlawful to use a fraudulent ID or to permit the use of one's ID by another to purchase or possess alcoholic beverages.
5. A conviction report is sent to Division of Motor Vehicles. Any person convicted of violating the above sections may automatically have his/her driver's license revoked for a period of one year.

DEFINITIONS

1. *Alcoholic Beverages*—any beverage containing at least one-half of one percent (0.5%) alcohol by volume, including beer, wine, liquor, and mixed beverages.
2. *Common Container*—any keg, large bottle, punch bowl, trash can, refrigerator or other device used for storing or mixing a quantity of beverage or from which a quantity of beverage may be distributed.
3. *Event*—a party, concert, or other group social gathering held on the university campus attended by students (e.g., a wine and cheese reception in an academic classroom).
4. *Legal Age to Drink*—21 years of age and older.
5. *Sale*—any transfer, trade, exchange or barter, in any manner or by any means, for consideration.
6. *Use of Alcoholic Beverages*—possession, consumption, distribution, purchase, sale or transfer of alcoholic beverages.

GENERAL PROVISIONS APPLICABLE TO ALL EVENTS

1. The use of alcoholic beverages is permitted only by those of legal age to drink and in accordance with N.C. law governing alcoholic beverages.
2. The sale of alcoholic beverages by students is prohibited. Alcoholic beverages may be sold by the university to students of legal age to drink at licensed premises.
3. The use of alcoholic beverages as a prize in a contest, drawing, raffle, lottery, etc., is prohibited.
4. The use of alcoholic beverages in games (e.g., quarters, drink-offs) is prohibited.
5. All residential and social groups are responsible for designating a member to participate in an Alcohol Awareness Session at the beginning of each academic year. This representative must recognize that he/she is responsible for disseminating current information concerning the use of alcohol and the existing state and university regulations concerning its use to members of his/her organization.
6. Sponsoring groups and living groups remain responsible for the general tone of their social event, and by majority vote they may adopt regulations more limiting than the laws of the state and the provisions of this policy.
7. Alleged violations of this policy by groups and/or individuals shall be subject to disciplinary action.

ALCOHOLIC BEVERAGES REGULATIONS

Registration

1. All events (see *Definitions*, above) that take place outside the confines of a residential facility (e.g., Von Canons, Multipurpose Building, quadrangles, etc.) must be registered with the Office of University Life, whether or not alcohol will be distributed at the event. In addition, even when an event takes place strictly within the confines of a residential facility, it must be

registered if sound amplification equipment is placed or directed outside (in accordance with Noise Policy regulations) and/or the event has been publicized (advertised by commercial ads, banners, posters, written invitations, etc.). Finally, an event must be registered if the sponsoring individual or group is using a facility other than that facility in which the individual or group resides.

The dean of Student Development and/or University Life designees reserve the right to approve/disapprove the serving of alcoholic beverages at events held in nonresidential locations (to include quadrangles) on a case-by-case basis. The dean of Student Development and/or University Life designees also will determine whether the individual or group sponsoring a registered event will be required to hire Public Safety officer(s) to assist in monitoring the event.

2. Events scheduled by graduate programs and university departments for their respective membership may take place on any day of the week provided that the event takes place in the facility of the sponsoring group with the permission of the appropriate dean or department head. Events which take place outside the confines of the sponsor's facility must be registered with the Office of University Life.

The required registration forms may be obtained in the Office of University Life, 101 Bryan Center, West Campus and must be completed and returned for approval to the office 72 hours prior to the event. Call 684-4740 for more information.

Event Parameters/Hours of Distribution

Distribution of alcohol to those of legal age may take place only between 5:00 P.M. on Friday and 5:00 A.M. on Sunday. Alcohol may not be distributed in conjunction with major campus activities (e.g., band on the quad) and may not be distributed between 5:00 A.M. on Sunday and 5:00 P.M. on Friday. Between 5:00 A.M. on Sunday and 5:00 P.M. on Friday, any alcohol consumption that takes place by individuals or groups may not involve the use of a common container (i.e., may not involve distribution). A common container is defined as any container which serves as a source of distribution of alcohol to event participants (e.g., keg, large bottle, punch bowl, trash can, ice tub, refrigerator, etc.). **It should be noted that the Noise Policy (as defined in the *Bulletin of Information and Regulations*) remains in effect.** If there are questions concerning a planned event, those may be addressed to the Office of University Life by telephone.

Petitions

The Alcohol Regulations Review Committee will receive petitions from ASDU, IFC, UHA and the university administration to allow distribution of alcohol at special events which fall outside the established event parameters. Individuals must address similar petitions to ASDU, IFC, and the UHA. Petitions will be reviewed at the end of each semester for events which will take place the following semester. The committee will advertise the date of the meeting at which petitions will be considered at least two weeks prior to the meeting. Petitions must be submitted to the dean of Campus Community Development at least one week prior to the meeting.

Monitoring System

Carding. The host group must designate members to check for proof of age at the entrance(s) to the event. Carders may not consume alcohol while working at the carding station. All cups must be kept at the door(s) and may be distributed only to persons who show proof of legal age to consume alcohol. Each individual, including members of the host group, who enters an event is to be carded. Each person who is 21 years of age or

older will have his/her hand stamped and will receive one cup. The stamp used must be a rubber stamp of the sponsoring group's name.

Serving. In accordance with state law, individuals must be 21 years of age to serve alcohol. The server should check for both a stamp and a cup before serving alcohol. Servers may serve alcohol only to those guests who present a stamp and the cup distributed by the carder(s). Servers may not serve alcohol to anyone presenting a cup designated for alternative beverages. Servers may not serve more than one drink at a time to an individual. Servers may not consume alcohol while serving alcohol.

Event Monitors. The host group must designate at least two persons to serve as event monitors during all events. The role of the monitors is to insure that the event is maintained within safe limits and to watch out for the safety of all event participants. The first monitor will have primary responsibility for insuring that alcohol policy regulations are being maintained away from the point(s) of distribution. This person will circulate throughout the environment of the event to insure that the alcohol policy regulations are being observed. The other event monitor(s) will have primary responsibility for insuring that the alcohol policy regulations are being maintained at the point of distribution. In residence halls where there may be multiple points of distribution (i.e., distribution points on different floors), one event monitor will be assigned to each floor to monitor the distribution of alcohol.

The names of the monitors must be posted in a visible location near the point(s) of distribution. Event monitors must be readily identifiable by t-shirts, aprons, hats, or armbands. **Event monitors may not consume alcohol at any time during the day on which the event is held. Event monitors may not serve alcohol.**

In such cases where the monitors must deal with someone who appears to have had too much to drink, the monitors are encouraged to take advantage of university resources. Monitors may call the Infirmary for instructions about how to take care of a student who is ill, or may call Public Safety for transportation to the Infirmary or the Emergency Room. Public Safety should also be notified when a student behaves in an uncooperative manner. Because the health and safety of students is of primary importance and because a timely response to medical emergencies is needed, no disciplinary action will be taken against an individual or group on the basis of information obtained during the delivery of medical treatment (e.g., at the Emergency Room, the Infirmary, and/or Pickens).

Watching out for the health and safety of all event participants is not solely the responsibility of event monitors; all event participants share this responsibility.

Alternative Beverages and Food.

During events at which alcohol is served, individual or group sponsors must insure that a sufficient amount of food and alternative beverages is present and is as easily accessible to event participants as are alcoholic beverages. For each keg or similar quantity of alcoholic beverage(s), the host will provide at least two cases of an alternative nonalcoholic beverage or the equivalent. Recommended alternative beverages include soft drinks (regular and diet), flavored soda water, "mocktails," and fruit juices. Water and unprepared powdered drinks are not acceptable alternative beverages. Cups for use by those drinking alternative beverages may be kept adjacent to those beverages. They must be distinguishable (by color or type) from the cups which are distributed at the entrance to the event.

For each keg or similar quantity of alcoholic beverage(s), the host will provide eighty one-ounce servings of food (e.g., five large bags of potato chips, pretzels, or popcorn, etc.; cheese, crackers, and vegetables with dip are also recommended.) Food provided for consumption at an event must be visible. This pertains to that which is placed out for consumption as well as that which is available to replenish what is eaten. It should be as visible as, but not necessarily adjacent to, the point of distribution of alcohol.

The event begins when alcohol becomes available for consumption (i.e., cans are present, kegs are tapped, or punch is mixed). All requirements of this policy must be in place at the time alcohol is available for consumption.

Health and Safety Intervention.

Because the health and safety of students is of primary importance, students are encouraged not only to look out for their own health and safety but also for that of their peers who are present at the event. Student Health educators serve as excellent programming resources and are willing to provide in-house programs about appropriate health and safety intervention. Students are encouraged to take advantage of this and other numerous resources as a way to learn more about appropriate intervention. When a person's health and/or safety is threatened or appears to be in jeopardy, it is recommended that immediate action be taken to prevent injury/illness/danger. The action may be a call to the Infirmary for assistance in handling a minor illness or a call to Public Safety for assistance in transporting a student to the Emergency Room. Whatever the particular need/problem, it is important to respond in a responsible and timely manner. Again, no disciplinary action will be taken against an individual or group on the basis of information obtained during the delivery of medical treatment.

Enforcement.

The Offices of Public Safety and of Student Development will be responsible for enforcement of the alcohol policy. Public Safety officers will make periodic random checks of the residence halls to insure adherence to the alcohol policy. The dean of Student Development reserves the right to implement additional monitoring measures as he/she deems appropriate. Failure to abide by the policy will result in disciplinary action.

SANCTIONS FOR VIOLATIONS OF THE ALCOHOL POLICY

Sanctions may include, but are not limited to, those listed below. In determining an appropriate response to violations of the Alcohol Policy, every attempt will be made to tailor a sanction to the physical/educational needs of the individual student or cohesive unit.

1. First offense violations.

These violations will be penalized according to the number of policy points involved. Policy points (one point each) include:

- (a) carding and monitoring;
- (b) restricted hours/days;
- (c) alternative beverages/food;
- (d) distribution to underage persons;
- (e) underage consumption.

A. Individual living on and off campus.

- (1) **1 point violation**—attendance at a two (2)-hour alcohol/drug education program provided by Student Health Education, PICAD, or other substance abuse specialist (to include discussion of the alcohol policy);
- (2) **2 point violation**—in addition to the sanctions for a 1 point violation, the individual must perform ten (10) hours of community service approved by the Health Education Office;
- (3) **3 or more point violation**—in addition to sanctions for a 2 point violation, must perform a total of thirty (30) hours of community service approved by the Health Education Office.

If an individual commits two or more offenses yearly for two years of a three-year period, they will be evicted automatically and could be subject to other disciplinary actions.

B. Groups*

*Individuals may not reserve the common areas of a residence hall. Only living groups or officially recognized student organizations may reserve a common room for an event. Should the provisions of this policy be violated, the reserving group will be held responsible.

- (1) **1 point violation**—attendance by entire group at a two (2)-hour alcohol/drug education program provided by Student Health Education, PICAD, or other substance abuse specialist (to include discussion of alcohol policy);
- (2) **2 point violation**—in addition to the sanctions for a 1 point violation, must perform ten (10) hours of community service per member with an alcohol or drug community organization;
- (3) **3 or more point violation**—in addition to the sanctions for a 2 point violation, the group must organize and attend a substance abuse program for the campus approved by Student Health Education.

2. Additional Offenses

A. Individuals living on campus

2nd offense—probation with letter (copy to parents if first-year student) placing housing license in jeopardy, mandatory meeting with health educator;

3rd offense—eviction from university housing (no rent refunded);

4th offense—(person is off campus) trespassed from residential areas of campus and possible additional disciplinary action.

B. Individuals living off campus

2nd offense—probation with letter warning of trespass for additional offense; mandatory meeting with health educator;

3rd offense—trespassed from residential areas of campus and possible additional judicial sanction.

C. Groups*

2nd offense—probation, common room locked for two weeks, mandatory meeting of all members with health educator, ten (10) hours community service per member;

3rd offense—common room locked for six weeks;

4th offense—common room locked, dissolution hearing for factual determination only.

If a group commits three or more offenses yearly for two years of a three-year period, the common room will be locked and dissolution hearings will be held for factual determination only. **The three-year period will consist of the current year and the two previous years.**

All community service hours must be completed by the end of the semester during which the violation occurred.

PARTY PROMOTION

By choosing to serve beverages containing alcohol as part of a social function, you and your group or organization assume certain responsibilities beyond direct university regulation.

Test cases involving common law precedents and the dispensation of alcoholic beverages are changing the definition of who is liable for a drinker's actions to include the general category of "social hosts." A social host may be a fraternity, a residence hall organization, a private citizen, or any combination of the preceding.

For example, serving alcohol to a minor who subsequently breaks his leg could render an individual or group liable for the minor's medical bills. Serving an individual who is "already" or "obviously" drunk and who subsequently has an automobile accident could render an individual or group liable for the injury or death of third party victims of the accident, or any property damage resulting from the accidents.

*Individual group members who fail to attend the meeting must perform twenty (20) community service hours approved by the Health Education Office.

In general, CREATING OR PROMOTING ANY SET OF CIRCUMSTANCES WHICH ENCOURAGE ANY OF YOUR GUESTS TO CONSUME ALCOHOL TO THE POINT OF INTOXICATION CAN HAVE FAR REACHING NEGATIVE CONSEQUENCES OF A MOST SEVERE NATURE.

Legal proof of negligence in the dispensation of alcohol usually involves the consideration of wide variety of factors, including the manner in which hosts promote social functions where alcohol is served.

In addition to the responsible monitoring of the social event itself, IT IS IMPERATIVE THAT YOU AND YOUR GROUP OR ORGANIZATION DO NOT PROMOTE YOUR EVENT IN SUCH A MANNER THAT A POTENTIAL GUEST MIGHT REASONABLY BELIEVE YOUR SOCIAL EVENT IS AN INVITATION TO BECOME INTOXICATED.

SPECIFICALLY: FLYERS, BANNERS, AND SIGNS WHICH ADVERTISE SOCIAL EVENTS WHERE ALCOHOL WILL BE SERVED MUST NOT OVERTLY OR COVERTLY STATE OR IMPLY AN INVITATION TO PARTICIPATE IN EXCESSIVE DRINKING.

ANIMALS ON CAMPUS

All animals found running loose on campus or tied to an obstacle with the animals unattended by the owner will be removed from the campus to the Durham County Animal Shelter by a county official. With the exception of seeing-eye dogs, animals are prohibited inside university facilities. Upon claiming the animal the owner will be required to furnish identification. The Department of Public Safety will refer the names of such students to the appropriate dean; employees will be referred to their department head. Other persons who indicate an unwillingness to cooperate with Duke University regulations in this matter will be given trespass warnings.

CAMPUS BANNER POLICY

Requests for hanging banners on university buildings must be approved by the Physical Plant Office. Banners must be inherently flame resistant or sprayed with a flame retardant spray as approved by the OESO–Campus Fire/Safety Office. If approved, a banner may be hung for a period of not more than three days. The banner must be removed by the sponsoring organization within 24 hours of the event that it advertises. In the event that there is no date for the banner, then a three-day maximum will be established for its display. If the group fails to remove the banner within the designated time, the university will remove it at a cost to the responsible organization or individuals. Where no sponsoring organization or individual may be identified, banners will be taken down immediately.

CHALKING OF UNIVERSITY FACILITIES

The extensive use of chalk to advertise events and activities on buildings, sidewalks, and other university facilities and structures has caused major problems because the chalk must be removed at a considerable expense. Therefore, any individuals or groups identified as being responsible for chalking university facilities will be charged for clean up and also may be subject to judicial action.

CONFERENCES AND CONVENTIONS

Invitations to individuals or to organizations outside the university to hold conferences or conventions on campus must be discussed with and approved by the dean of Student Development well in advance of the extension of the invitation by the prospective host or host group at Duke. It is the established policy of the university not to use its dormitory facilities for the housing of convention guests during the academic year. The university does, however, reserve the right to use dormitory rooms for special guests during announced vacations.

DISCRIMINATION, APPEAL PROCEDURE FOR STUDENTS EMPLOYMENT

Complaints from students of discrimination regarding hiring practices should be filed in writing with the Office of Undergraduate Financial Aid, 2106 Campus Drive. A staff representative of the Office of Financial Aid shall notify the university equal opportunity officer in writing of the complaint within ten (10) working days. The equal opportunity officer will investigate the complaint, notify the Office of Student Affairs and the respective college or school of the student, and attempt to reconcile the parties. Should the complainant feel that the complaint of discrimination has not been remedied after receiving a written evaluation from the equal opportunity officer, appeal may be made to the respective dean of the student's college or school.

DRUGS

Duke University prohibits its members to possess, use, or distribute illegal drugs, including opiates, barbiturates, amphetamines, marijuana, and hallucinogens, except for legally authorized possession and distribution of drugs of the classes specified. In addition, the presence and use of many of these drugs within the university community are contrary to the intellectual and educational purposes for which the university exists.

The university recognizes that ignorance or innocence concerning such drugs threatens the safety of members of its community. It therefore seeks to provide as much information as it can concerning the consequences of harmful drugs. The university recognizes also that the illicit use of drugs may reflect emotional problems and is prepared to assist its members involved in their use through medical and psychiatric counseling. Nevertheless, the university considers a violation of the drug prohibition a serious matter and reserves the right to take action appropriate to the circumstances of each case.

Action taken by the university in all cases of drug violation will be guided by a concern both for the emotional and physical welfare of the person involved and for the maintenance of a suitable educational environment for all members of the university. See Appendix E for rules governing drug violations.

FIRE EQUIPMENT

In an effort to provide adequate protection, fire extinguishers are located in all residence halls. Since the installation of this equipment, numerous fires have been quickly controlled, avoiding injury or loss of life. The potential impact of having fire extinguishers vandalized or stolen is clear; yet each year individuals continue to disregard the safety and rights of others by destroying and tampering with this equipment.

Damage and/or theft of fire equipment is punishable under North Carolina General Statute 14-286 which carries a maximum penalty of six months imprisonment and/or \$500 fine. In addition, students who have allegedly misused or vandalized fire equipment may have their housing licenses revoked and/or be referred for disciplinary action. Judgments rendered by this board may result in the loss of housing privileges and/or other punishment.

It is university policy that living groups or individuals be billed for theft and/or vandalism of fire extinguishers within the residence halls.

To further assure life safety, fire alarm systems are located in each residence hall at convenient locations to alert the occupants in case of fire. Turning in false alarms may result in unnecessary deployment of fire vehicles and the penalties for turning in false alarms or tampering with the alarm system are the same as those listed above. (See section on "Revocation of the Housing License," page 25.)

FIRE SAFETY

Open fires are not permitted on Duke University property except as approved by the Safety Office. Students who either provide or contribute materials to burn or who ignite or attempt to ignite flammable materials will be considered in violation of this policy. Students also should realize that such actions violate State law and may result in their being issued a citation for unlawful burning. Any fire must be reported to Public Safety and Housing Management. Residents will be charged for fire damage resulting from neglect.

FIREWORKS, OTHER EXPLOSIVES, AND WEAPONS

The General Statutes of North Carolina strictly prohibit the possession of firearms, explosives, starter pistols, and weapons on any university campus. Students are not permitted to bring to the campus or store on the campus any weapon, including any mace, gun, rifle, pistol, explosive, switch-blade, knife, or dagger. Students may not possess fireworks of any kind. If found to be in violation of this policy, students may have their housing licenses revoked and/or be referred for disciplinary action. See section on "Revocation of the Housing License," page 25.)

HAZING

Duke University considers hazing to be a serious infraction of university regulations. Hazing Policy: Any action taken or situation created, intentionally, whether on or off fraternity, sorority, or university premises, to include physical discomfort, embarrassment, harassment, or ridicule. Such activities and situations include but are not limited to paddling in any form; creation of excessive fatigue; physical and psychological shocks; road trips, or any other such activities carried on, in or outside the confines of the university; wearing publicly apparel which is conspicuous and not normally in good taste; engaging in public stunts and buffoonery, morally degrading or humiliating games and activities which are not consistent with fraternal law, ritual, or policy or the regulations and policies of Duke University. (Modified from: Statement on Hazing, Fraternity Executive Association.) Students should also be aware that hazing is a misdemeanor under North Carolina state law and is punishable by up to a \$500 fine and/or six months imprisonment. The action of even one member of the group may constitute hazing by the fraternity or sorority. Any fraternity or sorority convicted of hazing may be warned, placed on probation, or the charter of the group suspended for a period of time or permanently. Individuals responsible for hazing also are liable for disciplinary action.

IDENTIFICATION CARDS

Undergraduate students are issued identification cards (the DukeCard) which they should carry at all times. The cards are the means of identification for library privileges, student health services, athletic events, access to residence halls and academic buildings, and other university functions or services open to them as university students. These cards also serve to purchase food on a selected meal plan or other food and nonfood items on the flexible spending account. Students will be expected to present their cards upon request to any university official or employee.

The cards are not transferable, and fraudulent use may result in loss of student privileges or suspension. A student should report the loss of this card immediately to the Office of the Registrar, 103 Allen Building, 684-2813 or to the DukeCard Office, 024 Union Building West, 684-5800. Temporary cards for access to residence halls can be obtained at the DukeCard Office twenty-four hours a day. The cost of a new DukeCard is \$10.

LIBRARY MATERIALS SECURITY

Library materials are electronically protected from theft by automatic locking of the exit gates when items have not been properly charged. An alarm sounds simultaneously,

drawing attention to the situation and requiring the person to return to the circulation desk nearby to ascertain the problem.

Anyone who refuses to permit his or her books to be examined may be denied further use of the library. Student offenders will be reported to the appropriate dean of the university, who is authorized to refer such offenders to judicial boards or to take independent disciplinary action, including penalties, up to and including suspension, appropriate to the seriousness of the offense.

LIBRARY POLICY CONCERNING FOOD, DRINK, AND TOBACCO IN PUBLIC AREAS

This policy is meant to decrease:

- a. Damage to books and furnishings
- b. Attraction of vermin to the building and the collections
- c. Deterioration of a pleasant, studious environment in the reference area and general stacks
- d. Cost of housekeeping within this extensive building

The policy applies in public areas of the library to all persons, including university staff, faculty, students, and all others working in or using the library. Public areas include departmental quarters, elevators, hallways, stairwells, carrels, and all book stacks. Also, this policy applies while walking through public areas of the library.

1. No food or drink is to be consumed except in designated areas. These are: the study halls, the faculty/staff lounges, front lobby, Rooms 223A, 226, the Carpenter Board Room, and the Breedlove Room.
2. No smoking or other tobacco use is allowed anywhere in the building.
3. Food, drink, and tobacco will be subject to confiscation if used in undesignated areas.

MEDICAL CENTER STUDENT TRAFFIC

Duke Hospital and clinics provide medical service and support to thousands of patients and their families. Student traffic brings congestion, noise, and additional building maintenance that are incompatible with patient care.

Students are prohibited from using Duke Hospital South as a thoroughfare. Students must walk around Duke Hospital South via Trent Drive and Flowers Drive.

Additionally, students are not allowed to travel through Duke Hospital South to access Duke Hospital North.

Students are allowed access to Duke Hospital South for purposes of visiting the student infirmary, going to work, the bank, or the pharmacy. If requested, students must be able to document reason for being in the hospital. Hospital food service is not provided for students and is an unacceptable reason for accessing the hospital.

NOISE (DISORDERLY AND DESTRUCTIVE BEHAVIOR)

This policy has been developed after consultation with the Associated Students of Duke University, the Interfraternity Council, the Upperclass House Association, and the Residential Policy Committee. This policy is based on the belief that all persons residing in the community have a responsibility to respect the rights, health, security, and safety of other community members and that persons who repeatedly fail to respect others should no longer be afforded the privilege of residing in university housing.

Disorderly and/or destructive behavior by students is prohibited.

1. Any student accused of destroying personal or university property is liable for judicial action before the appropriate judicial body.

2. Quiet hours will be in effect throughout the campus except during the following hours on East, West, and North campuses:

5:00 P.M. to 2:00 A.M. on Friday,

1:00 P.M. to 2:00 A.M. on Saturday, and

1:00 P.M. to 6:00 P.M. on Sunday.

Quiet hours are in effect twenty-four hours a day at Central Campus Apartments.

- a. Violations of quiet hours will be subject to the sanctions listed below, or they may be referred to the appropriate judicial body for adjudication.
- b. Even during the "non-quiet" hours listed above, students are expected to continue to respect the rights of others.
- c. During quiet hours, students who are disturbed should attempt to resolve the situation by contacting the other party(ies) involved; or, if needed, seek the assistance of house officers or resident advisors. In some areas of campus, an internal system for dealing with disturbances has been established by house officers (including distributing lists of house officers and RAs to contact) which has worked quite effectively. In some quadrangles, representatives from the adjacent living groups have met to establish "acceptable" levels of noise (i.e. specific volume settings on sound amplification systems). All quadrangle areas are strongly encouraged to implement mutually agreed upon procedures.
- d. If necessary, complaints may be registered by calling Duke Public Safety at 684-2444. Complainants should provide their names and locations when calling the Public Safety Office. Even during the "non-quiet" hours listed above, public safety officers will continue to respond to complaints and will notify those creating a disturbance that a complaint has been made. The officer responding to complaints will indicate whether noise was discovered upon his/her arrival in the incident report. If noise is found to exist, a complaint is automatically subject to disciplinary action. If no noise is discovered, no action will be taken. Complaints filed during "non-quiet" hours will not be considered as violations of the policy unless extenuating circumstances are present such as noise interfering with classes in progress.
- e. Public Safety officers and resident advisors will forward to the associate dean of students a report of all noise complaints. In cases subject to disciplinary action, the Public Safety or Resident Advisor Incident Report will serve as the plaintiff. In cases where noise has been confirmed in one of the reports mentioned above, the following procedures and sanctions will be followed:
 1. For every complaint filed, a letter and a copy of the complaint will be forwarded to the student and/or president of the cohesive unit concerned informing them of the complaint.
 2. Upon receiving a third complaint, individuals and cohesive units will be issued an official warning.
 3. Upon receiving a fifth complaint, individuals and cohesive units will be placed on disciplinary probation for six (6) weeks.
 4. Upon receiving a seventh complaint, individuals will be issued a suspended housing license revocation and cohesive units will be placed on social suspension for two (2) weeks, effective immediately.
 5. Subsequent complaints will be referred to the appropriate judicial body.
- f. Should the Public Safety or Resident Advisor Incident Report indicate that the student/group had already been warned and that the noise persisted and necessitated a return to the same student room or house in the same evening, an investigation may be begun into violation of the Noise Policy as well as the additional charge of "contempt."

- g. Residential and quadrangle parties are permitted provided that such parties have been approved under procedures as implemented through the Office of University Life.
- h. Under no circumstances during quiet hours may stereo speakers be placed or directed outside. During "non-quiet" hours, an individual or cohesive unit may only place or direct speakers outside for a function that has been approved by the dean of University Life.

It should be noted that residents are responsible for the actions of their guests and that cohesive units, as a whole, may be held responsible for violations of this policy by their individual members. The judicial body adjudicating violations of the above policy will follow its established procedures and may impose any sanctions available to it.

PAINTING POLICY

There has been a long-standing tradition of allowing student organizations and individuals to paint the East Campus bridge. Students are reminded that this activity may not extend beyond the bridge to include the painting of roads, sidewalks, telephone poles, lamp posts, trees, or any other university or municipal areas. Any groups or individuals identified as being responsible for painting anything other than the bridge will be charged for clean up and may also be subject to judicial action.

(Also see: Chalking of University Facilities, p. 47)

PARTIES IN RESIDENTIAL AREAS OUTSIDE OF RESIDENCE HALLS AND "BEER BLASTS"

See "Alcoholic Beverages" in this bulletin.

PICKETS, PROTESTS, AND DEMONSTRATIONS

See Appendix D.

POLICY PROHIBITING ANIMAL ABUSE

1. Animals, live or dead, may not be used in pranks or otherwise for amusement or ceremony in connection with any institutional or university-recognized group function or activity. Violation of this policy or any other abuse of animals shall be grounds for disciplinary action.
2. For purposes of this policy, the term "animal" includes any wild or domesticated, warm-blooded or cold-blooded animal.

POLICY ON USE OF SEGREGATED FACILITIES

It is university practice not to discriminate in any way on the basis of race, creed or national origin. This statement covers official activities sponsored, financed, and controlled by university personnel and campus organizations, whether these activities are held on or off campus. If they are held off campus, they must not utilize facilities where discrimination is practiced. Naturally the university will not attempt to dictate to individual students, faculty members, or private groups how they should conduct their personal affairs outside the university.

The above policy applies to all social functions sponsored by undergraduate residence hall campus organizations. The failure of student groups to comply with this policy may result in suspension of their social privileges. Repeated offenses by campus organizations could result in the revocation of their charters.

POLICY FOR "THEME" PARTIES AND DECORATIONS

All living groups and cohesive units must adhere to the university safety policies when planning a theme party, event, or meeting. The following are strictly prohibited:

1. Open flames: Open fires, cooking fires, campfires, bonfires, candles, or any apparatus, device or machine utilizing an open flame is prohibited.
2. Party Decorations: Hay, straw, bamboo, pine straw, dried flowers, sand, or other dried natural materials may not be utilized inside the residence halls. Paper products such as crepe paper, newspaper, paper sacks, or other combustible materials should be sprayed with a flame retardant prior to use.
3. Electrical: All electrical equipment to include lights, wires, plugs, cords, connections, and sockets must be UL approved. The use of improvised wiring or tying wiring into the existing electrical services is strictly prohibited.
4. Animals: Animal(s), regardless of size or species, are strictly prohibited to attend or participate in any event, party, or meeting.
5. Water: Water, waterfalls, pools, spraying water, running water, or utilizing water in any way is strictly prohibited.
6. Strippers may not be invited or paid to perform at events sponsored by individual students, residential living groups, or cohesive units.
7. All trash must be removed by the event host at the close of the event.

Violations reported to the Office of Student Development will be considered serious offenses and living group and cohesive unit officers will be held accountable. Offenses reported will be handled by the appropriate adjudicatory body.

If you have any questions as to whether your party decorations fall within the limits allowed by university safety policies, please contact Bill Boten, OESO—campus fire/safety manager at 684-5609, 72 hours prior to the date of the actual event or party.

ROOF AND LEDGE AREAS, MAINTENANCE TUNNEL—UNAUTHORIZED ACCESS

The only authorized persons permitted on the roof and ledges or the tunnels of university buildings are maintenance personnel and certain other university officials. Students found in these areas will be referred for judicial action and/or may be subject to the immediate revocation of their housing license.

POLICY CONCERNING FILMS AT DUKE

This policy is applicable to all persons or groups on campus showing films which are open to a general audience. ("General audience" is meant to convey "other than a strictly defined group" such as an academic class, and does not refer to the rating of film content as in "rated G for general audiences"). Such groups include but are not limited to academic departments, departmental groups, residential units, fraternities and sororities, and DSG chartered or recognized organizations. The policy applies to films for which admission is free as well as those for which an admission fee is charged or a donation is requested. The policy does not apply to academic departments showing films to class members only for educational purposes.

Presenters

A. Film Committee Presenters

The two major film committees responsible for carefully chosen film series are (1) the D.U.U. Freewater Film Series, presenting 16mm film (in multiple showings of two or three presentations each evening) on Tuesday, Thursday, and Friday in the Griffith Film Theater, Bryan University Center, and on certain occasions children's films on Saturday morning; and (2) Quadrangle Pictures (Quad Flicks)—the oldest film program on campus presenting 16mm films on each Saturday and Sunday (two showings each evening) in the Film Theater.

Participation in these committees is open to students, faculty, and staff. For both series, contact the program adviser or the chairperson of the Freewater Presentations, 101 Bryan University Center, 684-2911. Both series solicit the

opinions of the student body and faculty in the selections of films and are most happy to cooperate whenever possible in bringing films requested by departments and organizations.

During the two summer sessions, Freewater and Quadrangle Pictures show films in the Griffith Film Theater, Bryan University Center one night a week.

B. General Campus Presenters

Monday and Wednesday evenings may be utilized by general campus presenters (including but not limited to academic departments, departmental groups, residential units, fraternities and sororities, and by organizations chartered or recognized by DSG) to have public showings of films on campus. If admission is charged, the sponsoring group must use the Griffith Film Theater of the Bryan University Center (for 16 mm films) or Page Auditorium (for 35 mm films), for which appropriate tax payment has been made to the state. The presenters should be aware of and should adhere to the following regulations:

1. All sponsors presenting forms on campus which are open to a general audience must register the film screening with the Office of University Life (101-3 Bryan University Center, 648-4741) in order to minimize conflicts between competing films. Film screening should be registered at the same time the venue is reserved. It is the responsibility of the sponsoring group to check other campus sources for possible conflicts. The Office of University Life is not responsible for conflicts due to the failure of any party to adhere to the *Policy Concerning Films at Duke*.
2. All film presentations must be sponsored by Duke University groups or organizations with funds from admission sales going to the respective group or organization.
3. No film showing may be presented for an individual's self-aggrandizement.
4. Groups or departments under the jurisdiction of Student Affairs (including all student groups) will have permission withheld for the showing of x-rated films until justification for their presentation is reviewed. Other films which, regardless of rating, contain explicit sex and/or violence or which have been found to encourage disruptive behavior also may be restricted or subject to special conditions. Academic departments and departmental groups are responsible for adherence to local ordinance and state law concerning audience admission and the film rating system.
5. All film presenters using Griffith Film Theater or Page Auditorium must employ the services of a house manager and a projectionist. The building manager, Bryan University Center (001A Bryan Center, across from Von Canon Hall) can arrange these services for the Griffith Film Theater. The manager of Page Auditorium (03 Page, 684-5155) should be contacted to arrange these services for Page Auditorium. Both offices will provide an estimate of costs for these services. These employees will be present throughout the entire presentation.
6. All public announcements for the film showings (such as flyers, posters, calendar, and *Chronicle* announcements) must be made to display clearly the sponsoring group's official name. Advertising for all film presentations is restricted to the campus media.

Resources

A. Film Sources

A complete up-to-date collection of film catalogues may be found in the D.U. Union Office and the University Life office, both at 101 Bryan University

Center. The reference room of Perkins Library also has extensive files of film catalogues and other relevant reference material. Catalogues may also be ordered directly from film companies.

B. Equipment

Griffith Film Theater and Page Auditorium are equipped with 16 mm and 35 mm projectors, respectively. Projectors and equipment for other venues may be rented from Technical Services (0044 Bryan University Center, inside the "greenhouse" by the circle). The Durham County Library (on North Roxboro Street) also has screens and 16 mm projectors for rent. You must have a library card to rent these.

C. Advising

The Office of University Life provides advising on all aspects of film presentation including choice of venue, choice of film, budget, and program logistics and management. Film committees and DSG chartered/recognized organizations are required to consult a dean of University Life when programming films. The Office of University Life also maintains a calendar of all film screenings on campus open to general audiences.

Locations for Film Showings. The auditoriums on the Duke campus authorized for film showings for which an admission is charged are the Griffith Film Theater in the Bryan University Center (16 mm) and Page Auditorium (35 mm). These venues are covered by the payment of a privilege license tax paid by Duke University to the state of North Carolina. To charge admission to films shown in other areas is in violation of state law and brings into question the legal position of the university.

Free Films. If no admission is charged and no donation is received, films may be publicly shown in any appropriate room on campus, but their scheduling must adhere to other rules applicable to general campus film presenters to prevent conflicts.

Possible Film Restrictions

- A. "X-Rated" Films Policy—Permission is withheld from film presenters for the showing of x-rated films until justification for their presentation is made through appeal.
1. An appeal by the Freewater Film Society and by other organizations under the jurisdiction of the University Union will be reviewed by the board of the University Union whose decision will be communicated to the vice-president for Student Affairs for final review.
 2. An appeal by all other student groups including DSG-chartered/recognized organizations will be reviewed by the vice-president for Student Affairs directly. All reviews and subsequent decisions will take into account, among other considerations, the objectives to be served by exhibiting the film, its educational value, and the extent to which the request can be supported by a social or aesthetic justification. When, in response to an appeal, permission is granted to present an x-rated film, the following procedures will be required: the vice-president for Student Affairs will (a) decide whether or not the film in question shall be listed in the *Duke Dialogue*, (b) designate what kind of identification may be required of members of the Duke University community and/or their guests, (c) decide whether or not a representative of the Public Safety Office may be required for the purposes of assisting the sponsoring group, at the latter's expense. In addition, those attending must show proof of age that complies with North Carolina state law.

- B. Other Film Restrictions—The decision to withhold the scheduling of films which, regardless of rating, contain explicit sex and/or violence are shown or have been found to encourage disruptive behavior may be made by:
1. The University Union board for films proposed by the Freewater Film Society and by other organizations under its jurisdiction.
 2. The deans of the Office of University Life for films proposed by other student groups or organizations. The decision by either of these boards to withhold the scheduling of a film may be appealed to the vice-president for Student Affairs. When in response to an appeal, a favorable decision is reached, the same procedures listed in (a) through (c) will be required.

Film Scheduling Procedures and Regulations

A. Regulation—All General Campus Presenters

1. All general campus presenters must register screening dates and film titles at the Office of University Life. Screening dates should be registered at the same time the venue is reserved or put on hold. Film title must be registered **before the film is ordered.**
2. Venues may be reserved for film screenings at any time in accordance with the reservation policies of the specific venue. The selection of specific film titles must be made according to the following schedule: for films shown in the fall semester, titles may be chosen after the preceding July 1; for films shown in the spring semester, titles may be chosen after the previous December 1; for films shown during summer sessions, titles may be chosen after April 1.
3. Film presenters may schedule only one film per semester. All exceptions must be approved by the Office of University Life.
4. No film may be shown that is already scheduled for the academic year until following the originally scheduled showing. If groups decide to show a film that is scheduled already, they may not announce publicly in any way their choice of film presentation until the initial group has shown the film.
5. No public film showing (those announced to the general university community) may be scheduled at the same time on the same day as another film which has been scheduled already, unless no conflict is perceived by the group having completed its scheduling paperwork first. It is the responsibility of the sponsoring group to check other campus sources for possible conflicts. The Office of University Life is not responsible for conflicts due to the failure of any party to adhere to the *Policy Concerning Films at Duke.*
6. Films shown outside must be registered and approved by Dean Suzanne Wasiolek in the Office of Student Development in addition to all other approvals, and must not fall within university quiet hours.

B. Procedures—Student Organizations

1. Consult the University Calendar and the Film Calendar in the Office of University Life as well as other campus sources to check for possible conflicts with other films and programs.
2. Put a "hold" on the venue for your most preferred available date(s)—(Mondays and Wednesdays only). For the Griffith Film Theater, contact Janice Daniel, 684-2656. (You must return a deposit to reserve the film theater within five business days after holding a date, or your hold will be cancelled.) For Page Auditorium, contact Dean Peter Coyle, 684-4682. For other locations, call the location for information.
3. Go to the Office of University Life for advising and information on film selection, budgeting, financial approvals, and program approvals. Approvals will not be given until the following arrangements have been made: (a)

the organization's account has been reviewed to determine the ability of the organization to cover the film rental, film transportation, and both security and technical costs of the film presentation, (b) all financial forms necessary for reserving the venue have been completed and signed, and (c) the film title has been chosen and approved and does not conflict with any other registered film showing. Information which you will need includes (1) rating of film, (2) running time of film, (3) cost of film and cost of film transportation.

4. When all approvals have been received and the film has been selected and approved, confirm reservation with the venue and make final arrangements for equipment rentals, house manager, and projectionist when necessary. (For Page Auditorium and Griffith Film Theater, house manager and projectionist are necessary.)
 5. **All arrangements and approvals for film showings must be completed no later than three weeks prior to the date of showing. Failure to do so may result in the forfeiture of your scheduling privileges and the cancellation of your program.**
 6. Approved and confirmed film showings in the Griffith Film Theater and Page Auditorium may be cancelled without penalty up to one week prior to the screening.
 7. Common areas in residence halls and other such university facilities may not be used for the showing of "stag" films.
- C. Procedures—Other Campus Presenters.
1. All other campus film presenters should reserve screening locations in accordance with each venue's normal reservation policies. Films open to general audiences are allowed on Mondays and Wednesdays only.
 2. All general campus presenters must register screening dates and film titles at the Office of University Life. Screening dates should be registered at the same time the venue is reserved or put on hold. Film title must be registered **before the film is ordered.**
 3. Non-student groups are responsible for adherence to local ordinance and state law concerning audience admission and the film rating system.

Screening of Copyrighted Videos

Federal law prohibits the public display of copyrighted videotaped material. This includes videos which you buy and those which you rent. "To perform or display a work or video 'publicly' means (1) to perform or display it at a place open to the public or at any place where a substantial number of persons outside of a normal circle of a family and its social acquaintances is gathered." (From the Federal Copyright Act, Title 17 United States Code, Section 101). Though the language is not specific, the showing of videos for social purposes to groups could be a violation of federal law. To avoid such conflict and decrease the likelihood of copyright violations, the following procedure should be followed when screening videos:

1. Never charge admission for a video screening of copyrighted material unless you have paid the proper authority a royalty to do so.
2. Whenever possible, video screenings for entertainment and social purposes should take place in private rooms.
3. In the event a video screening takes place in a common room, it is advisable to limit viewers to ten (10) people.

SAFETY

No institution can guarantee the safety of all students at all times. It is therefore recommended that students exercise caution at times and places known to be hazardous. It is recommended that students not study in a classroom alone or walk alone in

unlighted portions of the campus or between campuses after dark. The Public Safety Office (684-2444) may be called to request escort service.

1. Do not walk, jog, or bike alone outside of well-populated areas.
2. Keep your room and apartment door locked *at all times* whether or not you are present.
3. After the closing hours of women's residence halls, all external doors should be kept locked.
4. Immediately report to the Public Safety Office, 911, or 684-2444, any incident taking place that threatens safety or appears suspicious.

SOLICITATION POLICY

Commercial selling or soliciting in the residence halls or Central Campus Apartments is prohibited whether by residents or nonresidents.

The Bryan Center environs may be used for the purpose of sales, distribution, or events involving the use of sound amplification equipment. Any such activity must be sponsored by a recognized campus organization.

STUDENT RECORDS

In accordance with the Family Education Rights and Privacy Act of 1974, Duke University generally permits students to inspect their educational records and protects the information in such records from disclosure to third parties without the students' consent. The university's policy on the release of students' records is on file in the Office of the University Registrar.

Address and telephone information provided to the Office of the Registrar may be released without student consent unless written notification is provided to the office by the end of the second week of classes.

SUPPORT SERVICES FOR SURVIVORS OF SEXUAL VIOLENCE

Immediate Concerns. Get away from the situation, to a place that feels relatively safe—your room, a friend's room, an RA's room. Without identifying yourself, you can call Duke's Office of Sexual Assault Support Services (SASS) or Rape Crisis of Durham (RCD) for information. They can explain the implications of the actions you may be considering and can serve as your on-the-spot advocate in many of those instances. If a friend has been assaulted, these same services also are available to you in helping a friend.

To page the SASS coordinator 24-hours a day dial 970-2315, and at the prompt, enter your phone number and hang up. The coordinator will dial you back. You also can come by or call the Women's Center, 684-3897, or the SASS crisis line, 681-6882.

To reach Rape Crisis of Durham 24-hours a day call Helpline, 286-4000 and ask to speak to a rape crisis volunteer. Your number will be taken and the volunteer will call you back.

Immediate Medical Concerns. Go directly to the Emergency Department (ED) of the Duke Medical Center. You can call Public Safety, 684-2444 or 911 for transportation without having to make a report, although to get Victim's Assistance (pays for hospital bill), you will need to make a report. The services available are: medical care, evidence collection, payment options, and medication for pregnancy prevention (the "morning after pill") and for sexually transmitted disease prevention. To leave your options for pressing charges open, you will want to have evidence collected by the hospital within 72 hours of the assault.

Less Immediate Medical Concerns. Schedule an appointment at Student Health in the Pickens Building. You can call SASS for someone to accompany you if you would like. The services available are: medical care, medication for pregnancy prevention (the

"morning after pill") and for sexually transmitted disease prevention, and super-confidential HIV counseling and testing. All services are covered by the student health fee, except for a minimal charge for the "morning after pill." Anonymous HIV testing is available at the Durham County Health Department, 560-7600.

Counseling or Emotional Support. SASS provides basic crisis intervention (short term support), referrals to counselors on and off campus who have experience working with survivors, information sessions, and survivors' networks. Counseling and Psychological Services (CAPS) provides brief individual counseling/psychotherapy, referrals, and in some semesters, group counseling.

Safety and Law Enforcement. Duke Public Safety will respond on an emergency basis to provide transportation to the Emergency Department, take reports of an assault, investigate, and participate in the appropriate legal or judicial action. They are responsible for notifying the community in a case of continuing danger, and they can trespass individuals from campus or a particular area of campus (the equivalent of a restraining order).

Legal or Judicial Options. Your options include pursuing criminal charges, civil charges, and charges under the Duke judicial codes, which would involve making a report to either Durham City Police, Duke Public Safety, or the deans of Student Development. SASS or RDC can provide initial information and serve as an advocate for you through any of these processes. When you report and decide to press charges, the judicial authorities involved will determine the most appropriate means of adjudication. You may serve as a witness in the case. In the case of a university hearing, sanctions for a guilty verdict include, but are not limited to, recommendation for counseling, disciplinary probation, suspension, expulsion, and other sanctions deemed appropriate by the hearing body.

Academic and Residential Life. After a crisis or assault, you may have concerns about security or feel a need to change your residence, or your phone number. You also may also need academic intervention (an excuse from class, an extension, or a leave of absence). SASS can help you identify the appropriate deans and can accompany you or help you to arrange a meeting to discuss your needs.



TRAFFIC REGULATIONS

Motor vehicles must be registered annually at the beginning of the fall semester or, if a vehicle is acquired later, within five days after bringing it to campus. During the first week of fall semester classes, registration will take place in the Bryan Center. All other registration takes place in the Parking Services Office, 717 Broad Street, and at other places and times as announced. Students in the School of Medicine and other Medical Center programs, residents of Hanes House and Trent Hall, will all register through the Medical Center Traffic Office at places as announced. There is an annual parking fee, determined by location and status. Students must present their student identification card.

Upon registration of a motor vehicle, students will receive a copy of the university motor vehicle regulations. Operation of a motor vehicle on the campus is contingent upon compliance with these regulations.

All vehicles parked illegally, including bicycles, motor bikes, motor scooters, and motorcycles parked within the residential hall buildings, may be subject to towing.

USE OF QUADRANGLE SPACE

Reservations for the use of all quadrangle space must be directed to the manager of the Bryan Center. All events scheduled on quadrangles must be registered with the Office of University Life. Only in rare circumstances will the Chapel, academic, or main residential quadrangle areas be made available for events.

Recreational use of the aforementioned quadrangles, in addition to the East Campus main quadrangles, is prohibited. Such use includes, but is not limited to, football and volleyball games, organized frisbee competitions, etc. Students identified as participating in such activities will be referred to the Office of Student Development for possible disciplinary action.

VENDING AND ELECTRONIC GAMES (PIN-BALL, FOOSBALL, ETC.) EQUIPMENT

Only university-owned vending and electric game equipment is permitted in the residence halls. Living groups interested in renting this type of equipment should contact Duke University Vending Services, a service component of the Duke University Stores. Such equipment rented from sources outside the university is prohibited.

VIDEO CASSETTE RECORDERS

Students are advised that Federal copyright law restricts the use of videocassette recorders to private showings and prohibits their public performance.

POLICY ON NONDISCRIMINATION

Duke University does not discriminate on the basis of race, color, national origin, handicap, sexual orientation or preference, gender, or age in the administration of educational policies, admission policies, financial aid, employment, or any other university program or activity. The university admits qualified students to all the rights, privileges, programs, and activities generally accorded or made available to students. For further information, call Leonard Beckum, University Equal Opportunity Officer (919) 684-4736.

Academic Honesty



Use and Acknowledgement of Sources

THE IMPORTANCE OF ACADEMIC INTEGRITY

Independent learning and the acceptance of individual responsibility are values which are highly regarded among undergraduates at Duke University. It is recognized that personal integrity, and the achievement of genuine scholarship in a community of mutual respect, depend upon the commitments of students as well as faculty to these ideals.

Independent learning sometimes involves one in an investigation of novel data or ideas, and in the formulation of original hypotheses. Yet for most college students, independent learning means the patient search for information, the sifting of criticism which others have published, and the use of this material in the statement and defense of their own conceptions and judgements. From the reading of books, periodicals, and other printed materials, research papers and original compositions are written in partial fulfillment of course requirements. It is therefore of importance that all students understand what is expected of them in using and acknowledging such source materials.

Some entering students may have given little, if any, thought to the issue of academic honesty, for they may have been permitted to copy word for word encyclopedias and other reference works without the use of quotation marks. More perhaps have become accustomed to paraphrasing other peoples' ideas without giving credit to whom credit is due. Some students, who have recognized such common forms of plagiarism and avoided them may have fallen into habits of writing which are nonetheless dishonest. A chief contributing factor is a careless manner of notetaking, in which a student's own comments become hopelessly entangled with the words and phrases copied from sources. When notes of this kind are used as a basis for a report, one usually is either unable to identify clearly the ideas which are not one's own, or else, since the sources are not open before him/her at the time of writing, one can easily suppose that no credit need be given. In this way essentially honest students can and do unwittingly undermine their own academic integrity, and that of the community of scholars to which they belong.

It is sometimes protested that educators are too scrupulous in this matter, that there are so many borderline cases as to make the maintenance of standards impracticable. Are not books written to be used by anyone who chooses to rely on them? Do not researchers publish their ideas for others to share? How is one able to distinguish clearly between privileged information and public or common knowledge? Yet thoughtful consideration will lead one to see why honesty is the *sine qua non* of scholarship, the essential binding principle of any sound academic community and why scrupulosity in this matter is necessary.

A scholar's contributions are his/her ideas and insights; these are their actual achievements. While in college he/she receives recognition for his/her ideas and skills in the form of grades and credit toward graduation and, in some cases, scholarship awards. After graduation, one may be offered fellowships for graduate study or job opportunities on the basis of these accomplishments. Such things are posited on the faith that a scholar's work and achievements are their own, and that one's record indicates accurately the extent to which the student is able to organize in his/her own way that knowledge which is important to the work he/she is fitted to do. Unless the evaluation of each student's accomplishment is based on his real abilities, on work actually done and rewards gained, the student's college record becomes a fraudulent document, and an unfair advantage is gained over other students whose scholarship is honestly represented. Among the many factors essential to the good life of a quality college, commitment to the value of academic integrity is crucial. Students assume individual responsibility in this matter; their failure to do so, for whatever cause, is especially lamentable.

The following is published to provide basic information on the subject. First, there is reproduced a definition of plagiarism which, by furnishing examples, illustrates the improper use of source material. The appendix is a statement written by the chairman of the Undergraduate Judicial Board.

A DEFINITION OF PLAGIARISM

The academic counterpart of the bank embezzler and of the manufacturer who mislabels his product is the plagiarist, the student or scholar who leads his reader to believe that what he is reading is the original work of the writer when it is not. If it could be assumed that the distinction between plagiarism and honest use of sources is perfectly clear in everyone's mind, there would be no need for the explanation that follows: merely the warning with which this definition concludes would be enough. But it is apparent that sometimes people of good will draw the suspicion of guilt upon themselves (and, indeed, are guilty) simply because they are not aware of the illegitimacy of certain kinds of "borrowing" and of the procedures for correct identification of materials other than those gained through independent research and reflection.

The spectrum is a wide one. At one end there is a word-for-word copying of another's writing without enclosing the copied passage in quotation marks and identifying it in a footnote, *both* of which are necessary. (This includes, of course, the copying of all or any part of another student's paper.) It hardly seems possible that anyone of college age or more could do that without clear intent to deceive. At the other end there is the almost casual slipping in of a particularly apt term which one has come across in reading and which so admirably expresses one's opinion that one is tempted to make it personal property. Between these poles there are degrees and degrees, but they may be roughly placed in two groups. Close to outright and blatant deceit—but more the result, perhaps, of laziness than of bad intent—is the patching together of random jottings made in the course of reading, generally without careful identification of their sources, then woven into the text, the cement to hold the pieces together. Indicative of more effort and for that reason, somewhat closer to honesty, though still dishonest, is the paraphrase, an abbreviated (and often skillfully prepared) restatement of someone else's analysis or conclusion, without acknowledgement that another person's text has been the basis for the recapitulation.

The examples given below should make clear the dishonest and the proper use of source material. If instances occur which these examples do not seem to cover, conscience will in all likelihood be prepared to supply advice.

THE SOURCE

The importance of the Second Treatise of Government printed in this volume is such that without it we should miss some of the familiar features of our own government. It is safe to assert that the much criticized branch known as the Supreme Court obtained its being as the result of Locke's insistence upon the separation of powers, and that the combination of many powers in the hands of the executive under the New Deal has still to encounter opposition because it is contrary to the principles enunciated therein,

the effect of which is not spent, though the relationship may not be consciously traced. Again we see the crystallizing force of Locke's writing. It renders explicit and adapts to the British politics of his day the trend and aim of writers from Languet and Bodin through Hooker and Grotius, to say nothing of the distant ancients, Aristotle and the Stoic school of natural law. It sums up magisterially the arguments used through the ages to attack authority vested in a single individual, but it does so from the particular point of view engendered by the Revolution of 1688 and is in harmony with the British scene and mental climate of the growing bourgeoisie of that age. Montesquieu and Rousseau, the framers of our own Declaration of Independence, and the statesmen (or should we say merchants and speculators?) who drew up the Constitution have re-echoed its claims for human liberty, for the separation of powers, for the sanctity of private property. In the hands of these it has been the quarry of liberal doctrines; and that it has served the Socialist theory of property based on labor is final proof of its breadth of view.

CHARLES L. SHERMAN,
"Introduction" to John Locke,
Treatise of Civil Government and A Letter Concerning Toleration.

1. WORD-FOR-WORD PLAGIARIZING

It is not hard to see the importance of the Second Treatise of Government to our own democracy. Without it we should miss some of the most familiar features of our own government. It is safe to assert that the much criticized branch known as the Supreme Court obtained its being as a result of Locke's insistence upon the separation of powers; and that the combination of many powers in the hands of the executive under the New Deal has still to encounter opposition because it is contrary to the principles enunciated therein, the effect of which is not spent, though the relationship may not be consciously traced. The framers of our own Declaration of Independence and the statesmen who drew up the Constitution have re-echoed its claims for human liberty, for the separation of powers, for the sanctity of private property. All these are marks of the influence of Locke's *Second Treatise* on our own way of life.

In this example, after composing half of a first sentence, the writer copies exactly what is in the original text, leaving out the center section of the paragraph and omitting the names of Montesquieu and Rousseau where the text is taken up again. The last sentence is also the writer's own.

If the writer had enclosed all the copied text in quotations marks and had identified the source in a footnote, the writer would not have been liable to the charge of plagiarism; a reader might justifiably have felt, however, that the writer's personal contribution to the discussion was not very significant.

2. THE MOSAIC

The crystallizing force of Locke's writing may be seen in the effect his *Second Treatise of Government* had in shaping some of the familiar features of our own government. That much criticized branch known as the Supreme Court and the combination of many powers in the hands of the executive under the New Deal are modern examples. But even the foundations of our state—the Declaration of Independence and the Constitution—have re-echoed its claims for human liberty, for the separation of powers, for the sanctity of private property. True, the influence of others is also marked in our Constitution—from the trend and aim of writers like Languet and Bodin, Hooker and Grotius, to say nothing of Aristotle and the Stoic school of natural law; but the fundamental influence is Locke's *Treatise*, the very quarry of liberal doctrines.

Note how the following phrases have been lifted out of the original text and moved into new patterns:

crystallizing force of Locke's writing
some of the familiar features of our own government
much criticized branch known as the Supreme Court
combination of many powers in the hands of the executive under the New Deal
have re-echoed its claims for human liberty . . . property
from the trend and aim . . . Grotius
to say nothing of Aristotle and . . . natural law
quarry of liberal doctrines

As in the first example, there is really no way of legitimizing such a procedure. To put every stolen phrase within quotation marks would produce an almost unreadable, and quite worthless, text.

3. THE PARAPHRASE

Paraphrase: Many fundamental aspects of our own government are
Original: Many familiar features of our own government are
apparent in the *Second Treatise of Government*. One can safely
apparent in the *Second Treatise of Government*. It is safe to
say that the oft-censured Supreme Court really owes its existence
assert that the much criticized . . . Court obtained its being as
to the Lockean demand that powers in government be kept
separate; equally one can say that the allocation of varied
and that the combination of many powers
the New Deal has still to encounter opposition because it is
New Deal has still to encounter opposition because it is
contrary to the principles enunciated therein . . . Once more it
contrary to the principles enunciated herein . . . Again we see
it is possible to note the way in which Locke's writing clarified
the crystallizing force of Locke's writing.
existing opinion.

The foregoing interlinear presentation shows clearly how the writer has simply traveled along with the original text, substituting approximately equivalent terms except where understanding fails him, as it does with "crystallizing," or where the ambiguity of the original is too great a tax on his ingenuity for him to proceed, as it is with "to encounter opposition . . . consciously traced" in the original.

Such a procedure as the one shown in this example has its uses; for one thing, it is valuable for the student's own understanding of the passage; and it may be valuable for the reader as well. How, then, may it be properly used? The procedure is simple. The writer might begin the second sentence with: "As Sherman notes in the introduction to his edition of the *Treatise*, one can safely say . . ." and conclude the paraphrased passage with a footnote giving the additional identification necessary. Or the writer might indicate directly the exact nature of what he/she is doing, in this fashion: "To paraphrase Sherman's comment . . ." and conclude that also with a footnote indicator.

In point of fact, this source does not particularly lend itself to honest paraphrase, with the exception of that one sentence which the paraphraser above copied without change except for abridgment. The purpose of paraphrase should be to simplify or to throw a new and significant light on a text; it requires much skill if it is to be honestly used and should rarely be resorted to by the student except for the purpose, as was suggested above, of personal enlightenment.

4. THE "APT" TERM

The *Second Treatise of Government* is a veritable quarry of liberal doctrines. In it the crystallizing force of Locke's writing is markedly apparent. The cause of human liberty, the principle of separation of powers, and the inviolability of private property—all three major dogmas of American constitutionalism—owe their presence in our Constitution in large part to the remarkable *Treatise* which first appeared around 1685 and was destined to spark within three years, a revolution in the land of its author's birth, and ninety years later, another revolution against that land.

Here the writer has not been able to resist the appropriation of two striking terms—"quarry of liberal doctrines" and "crystallizing force"; a perfectly proper use of the terms would have required only the addition of a phrase: The *Second Treatise of Government* is, to use Sherman's suggestive expression, a "quarry of liberal doctrines." In it the "crystallizing force"—the term again is Sherman's—of Locke's writing is markedly apparent . . .

Other phrases in the text above—"the cause of human liberty," "the principle of the separation of powers," "the inviolability of private property"—are clearly drawn directly from the original source but are so much matters in the public domain, so to speak, that no one could reasonably object to their reuse in this fashion.

Since one of the principal aims of a college education is the development of intellectual honesty, it is obvious that plagiarism is a particularly serious offense, and

the punishment for it is commensurately severe. What a penalized student suffers can never really be known by anyone but the student; what the student who plagiarizes and “gets away with it” suffers is less public and probably leaves a mark on him or her as well as on the institution of which he is a member.

STATEMENT BY THE CHAIRMAN OF THE UNDERGRADUATE JUDICIAL BOARD

Duke University, as a community of scholars, strongly relies upon the standard of academic integrity. Plagiarism and other forms of academic dishonesty represent a corruption of this integrity and, as such, cannot be tolerated within the community.

The Undergraduate Judicial Board actively affirms the requirement that every undergraduate student at Duke read and understand the “Statement on Academic Honesty.” This statement provides a definitive explication of what is required, in terms of academic honesty, of each student in the community. It has been the sad experience of the board that many cases of academic dishonesty are the result of ignorance as to what exactly constitutes this dishonesty. We firmly urge that each student refer to the statement whenever there is any question about matters of academic honesty. This small investment in time almost certainly outweighs the possibility of badly damaging one’s academic career through ignorance or carelessness.

Ignorance of what constitutes academic dishonesty is no excuse for actions which violate the integrity of the community. The board must view any offense of academic dishonesty with the utmost gravity and will determine sanctions commensurate with the severity of the violation. In a community which builds on the notion of academic integrity, the threat of academic dishonesty represents an intolerable risk.

Appendices



Appendix A

LICENSE TO OCCUPY RESIDENCE HALL SPACE

FULL NAME: _____
(first) (middle) (last) (social security number)
HOME ADDRESS: _____

ACADEMIC YEAR 1994-95 or SPRING 1995

DUKE UNIVERSITY HEREBY LICENSES THE UNDERSIGNED TO OCCUPY A RESIDENCE HALL SPACE FOR THE ACADEMIC YEAR INDICATED DURING THE PERIODS WHEN RESIDENCE HALLS ARE OFFICIALLY OPEN FOR OCCUPANCY BY LICENSED STUDENTS. THE OFFICIAL OPENING AND CLOSING DATES OF RESIDENCE HALLS AND RECESS PERIODS DURING THE YEAR WHEN RESIDENCE HALLS ARE NOT OPEN FOR OCCUPANCY ARE PUBLISHED BY THE DEPARTMENT OF HOUSING MANAGEMENT. THIS LICENSE AUTOMATICALLY TERMINATES IF THE STUDENT OFFICIALLY WITHDRAWS, GRADUATES, OR CEASES FOR ANY REASON TO BE A FULL-TIME STUDENT.

I have read the accompanying Terms under which I may occupy residence hall space, and I understand that my continued occupancy is conditional upon my compliance with these Terms and all applicable University Regulations. If I violate these Terms or regulations, the University may revoke this License and may refuse to license me for any occupancy period subsequent to the one provided in this License. I further understand that the Terms of this Agreement and University Regulations are subject to reasonable changes and that, provided I have been notified of such changes, the University may revoke this License should I violate any Term or Regulation in effect during my occupancy under this License.

Nothing in this License shall be interpreted as relief from the responsibility to comply with federal, state, and local law; and violation of any applicable law may be reason for revocation of this License.

In consideration of this License, I agree to pay the University according to the schedule of payments for the type of room I occupy as approved by Duke University, a copy of which has been furnished. I understand that, in the event the University revokes this License because I have violated the Terms of this Agreement or University Regulations, I must vacate the room I am occupying immediately and the University shall not refund any portion of the payment made for the semester in progress. In the event I officially withdraw, graduate, or cease for any reason to be a full-time student, I agree to vacate the residence hall within forty-eight (48) hours. I understand that I will be charged for housing based on the number of days I have occupied a space and will

receive a refund for any amount I have paid for housing beyond the time of my departure. The number of days I have occupied the space will be determined according to the date Housing Management inspects the room and confirms that my space has been vacated.

(for Duke University) (Date)

(Signature of Student) (Date)

Space Requested and Reserved

SPACE RESERVED _____

(room number)

(house)

ROOM DESCRIPTION:

Type of Room: Single _____ Double _____ Triple _____ Single as Double* _____ Double as Triple* _____

TERMS UNDER WHICH DUKE UNIVERSITY LICENSES OCCUPANCY OF RESIDENCE HALL SPACE

The purpose of these Terms is to establish understanding among students who reside in Duke University's residence halls and between these students and the University with regard to use of residential facilities. These Terms are an integral part of the License and are enforceable as covenants and conditions of the License. Any violation of the Terms could lead to revocation of this License and/or disciplinary action. Occupants are responsible for the actions of their guests.

These Terms apply only during periods when the Residence Halls are officially open for occupancy by licensed students. A student in the Residence Halls at any other time may be trespassed from the premises.

I. ELIGIBILITY

Rooms in the Residence Halls are available for assignment to full-time Duke University students who are working towards a degree. Students who withdraw from school, take a leave of absence, or move off-campus must vacate the room within forty-eight (48) hours from the date of such withdrawal, leave, or move.

II. PAYMENTS, RETENTION OF PAYMENTS, AND TERMINATION OF LICENSE

- A. Students pay for their License on a semester basis. Payments are to be made to the Office of the Bursar in accordance with established terms of that Office.

*Undergraduate students assigned to single rooms converted for double occupancy and double rooms for triple occupancy may be moved to normal single or double rooms to improve student living conditions and to ensure better use of facilities. The student will be financially responsible for the announced rate for a normal single or double room as applicable. Vacancies occurring in single rooms used as doubles or in double rooms used as triples will make that (those) remaining occupant(s) financially responsible for the announced rate for a single or double room as applicable for the remainder of the term of the license.

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- B. A prepayment of fifty dollars (\$50) must be paid in the spring by every resident student desiring to reserve a space in University housing for the following academic year. Payment must be made prior to the deadline published by the Office of Student Development. This fee will be applied to rent for the fall semester. The rent prepayment is not refunded to any student who cancels his/her housing reservation after the last day of spring semester classes unless the student is involuntarily withdrawn from the University.
- C. A one hundred dollar (\$100) Residential Deposit must be paid by each new student upon admission to the University. While a student lives in University housing, it is understood and agreed that his/her Residential Deposit shall not be applied to fees. Upon permanently vacating University housing, Duke shall, within ninety (90) days, refund said deposit, less any outstanding fees incurred in accordance with the established University policy. Charges for damages in excess of the Residential Deposit shall be assessed to the student. The Residential Deposit will not be refunded after residential space is reserved to new students who fail to matriculate. Any currently enrolled student will receive a refund of the Residential Deposit if written cancellation is received by Student Development by July 1 for the fall semester and by December 1 for the spring semester.
- D. Each resident is required to obtain a Duke Card and a room key at the time of his/her occupancy. The room key must be returned to the appropriate Service Office within forty-eight (48) hours of vacating the assigned space. Failure to return the key within the 48 hour time period will result in a charge to the student's Bursar's account.
- E. An undergraduate student who has been assigned a room and who wishes to cancel the assignment must notify the Office of Student Development in writing. Students who cancel their assignments after the contract has begun will be entitled to a refund of the unused rent. The amount of the unused rent is determined by the date of written notification to the Office of Student Development or the date of vacating the Residence Halls, whichever is later. In any case, a minimum of \$50 will be retained by the Department of Housing Management.

III. RESERVATION, ASSIGNMENT, AND ROOM CHANGE PROCEDURES

- A. The License will not be effective unless accompanied by a signed Food Contract for the same academic year.
- B. Reservations for preregistered upperclass students who have paid Residential Deposits and the fifty (\$50) prepayment of rent will be made in accordance with procedures announced by the Dean of Student Development. Every effort will be made to assign students in accordance with their preferences; however, the Dean or designee reserves the right to make or change final room assignments if in his/her judgment such reassignments are necessary.
- C. Exchange or transfer of rooms by students may be made only by the following procedure: (1) approval of room change by the Dean of Student Development or designee, (2) official inspection of vacated room by the Department of Housing Management, (3) change of keys in appropriate Service Office. In all of the above, the student(s) seeking the change is (are) responsible for making appointments and arrangements. Any unofficial room change may lead to revocation of this License and will not relieve the student(s) involved of the obligation to pay for occupancy, damages, and other costs for the officially assigned room.
- D. Vacancies existing in rooms will be filled by the Dean of Student Development or designee.
- E. Undergraduate students assigned to single rooms converted for double occupancy and double rooms converted for triple occupancy may be moved to normal single or double rooms to improve student living conditions and to ensure better use of facilities. The student will be financially responsible for the announced rate for

a normal single or double room as applicable for the remainder of the term of the License.

- F. Vacancies occurring in single rooms used as doubles or in double rooms used as triples will make the (those) remaining occupant(s) financially responsible for the announced rate for a single or double room as applicable for the remainder of the term of the License.

IV. PROCEDURES, MAINTENANCE, STORAGE, AND DAMAGES

- A. Maintenance will be performed normally on a routine basis; however, corrective, emergency, and preventive maintenance will be assigned as necessary.
- B. The University retains the right to enter the premises without the resident being present to carry out maintenance tasks, to conduct inspections regarding availability of space, and to take care of emergency or any equipment failure which is causing damage or hazard to property or persons. Entry into the room for other reasons will be made during reasonable hours with notice to the assigned occupants.
- C. The Department of Housing Management cleans each room prior to occupancy. Thereafter it is the responsibility of the resident(s) to clean the room. The room is expected to be left in a clean condition by the vacating resident(s). If a room requires extraordinary cleaning after occupancy, the cost will be charged to the resident(s). Housekeeping services will be provided on weekdays during the academic year (excluding holidays) only in common areas of the residence halls. The cost of extraordinary cleaning resulting from a living group's activities will be charged to the living group.
- D. The University is not liable for damage or loss of personal property. **Because the University does not provide insurance, occupants are encouraged to provide their own personal property insurance.**
- E. The University is not liable for the failure or interruption of utilities (including air-conditioning in those residential facilities in which air conditioning units have been installed) or for damages resulting from failure or interruption of utilities or equipment. Residents are not entitled to any compensation or abatement of rent.
- F. Use of nails, screws, tacks, or adhesives which damage walls, furniture, or fixtures is prohibited. Advice on nondamaging ways of hanging artwork and other items is available from Housing Management.
- G. Buildings, building equipment, and furniture repairs or replacements necessitated by damage beyond normal wear and tear will be billed to the appropriate student(s) or living group in accordance with official procedures published by Housing Management. At the end of each academic year, outstanding living group charges will be divided equally among the group's members and charged to their student ledgers.
- H. The assigned occupant(s) is (are) responsible for reporting to Housing Management defects or damages found in a room within five working days after occupancy. (Forms are provided for the initial inspection by the Department of Housing Management.) The resident(s) of a room will be charged for any damages or modifications found in the room after occupancy unless previously noted on the inspection form.
- I. Each bedroom is equipped with furniture by the Department of Housing Management. The resident(s) of a room will be charged for any furniture missing from that room. Personally owned furniture may be added to the room by a resident provided all residents of that room consent and the furniture is removed by the residents at the end of occupancy. Costs for removing any remaining personal furniture will be charged to the residents.

- J. Students are collectively responsible for care of public areas including furnishings and equipment. Commons furniture owned by Duke University Housing Management may not be removed from its intended location. Anyone doing so may be charged with theft under the Judicial Code. Commons furniture found in bedrooms may be removed by University personnel at the expense of the occupant(s).
- K. Resident students may place empty trunks, luggage, and specialized packing cartons (e.g., stereo boxes) in storage rooms during the effective period of the license at no charge. The University takes no responsibility for the items stored or their contents. Procedures for storage on a fee basis are available from the Department of Housing Management.
- L. Non-University property left in rooms after the license period terminates will be disposed of at the discretion of Housing Management.

V. TERMS AFFECTING RIGHTS, ORDER, HEALTH, AND SAFETY

The following Terms are designed to protect the health and safety and to provide for the comfort and privacy of all students who are licensed to occupy residence hall space. In addition to the following specific Terms, any conduct which reflects a serious disregard for the rights, health, security, and safety of other occupants of the residence halls will be regarded as a violation of the License. Every effort will be made to assign students in accordance with their preferences. However, the Dean reserves the right to make or change final room assignments if in his/her judgment such reassignments are necessary.

- A. Students are entitled to privacy in their assigned rooms as set forth in the University Privacy Policy published in the *Bulletin of Information and Regulations*. Sanitary or safety inspections may be conducted by government officials without notice in accordance with the General Statutes of North Carolina and city and county ordinances. When the residence halls are officially closed during Christmas recess, inspection of rooms will be made by University officials to ensure that no fire or other hazards exist. Hazardous items will be removed and the student(s) involved will be notified when the buildings are officially opened.
- B. The unofficial use or possession of residence hall keys, including possession of master keys or keys other than those assigned to the student, is prohibited. Keys are not transferable; switching keys with other students is prohibited.
- C. Propping open outside residence hall doors or in any way tampering with the security system of the residence hall is prohibited.
- D. Lost/stolen DukeCards must be reported immediately to the DukeCard Office and a replacement can be obtained. A lost/stolen key must be reported immediately to the appropriate Service Office and a replacement key obtained. A lost/stolen key will result in a charge to the student's Bursar's account. The bedroom door lock will be changed if the resident is unable to present the lost/stolen key to the Service Office within two weeks.
- E. Except in case of fire, firefighting equipment and alarms shall not be tampered with and shall remain in place. Residents must comply with all fire drills and fire regulations. Fires must be reported to Public Safety and Housing Management.
- F. Personally owned air-conditioning equipment and heating is not permitted in residence hall areas. Compliance with any existing University energy conservation policy is required.
- G. Tampering with electrical wiring, including, but not limited to, the installation of direct wired ceiling fans and dimmer switches, is prohibited.
- H. Locks and plumbing are not to be tampered with or changed by occupants.
- I. Damage caused by electrical appliances which are not owned by Duke University is the responsibility of the resident(s).
- J. Waterbeds are prohibited.
- K. In accordance with North Carolina General Statute 14-269.2, no firearms, explosives, fireworks, highly inflammable materials, or any articles which may be used as offensive

weapons may be in the residence halls or on the campus. This includes knives, slingshots, clubs, mace, pellet guns, rifles, BB guns, and all firearms and items of like kind.

- L. Animals, including, but not limited to, birds and reptiles, are not allowed in or around the residence halls even for short periods. An extermination, at the resident's expense, will be done if an animal enters the residence halls. Fish are allowed provided they are kept in an aquarium no larger than 25 gallons, the container is cleaned regularly, and no illegal species are kept.
- M. No personal effects may be left in the hallways, stairwells, or common areas of the residence halls; any personal effects so found will be disposed of at the discretion of the Department of Housing Management.
- N. Selling or soliciting in the residence halls, by residents or outsiders, that is either commercial or unrelated to University objectives or activities is prohibited.
- O. A room may be occupied only by the student holding a License for that room. This License may not be transferred by the student to another person. Guests are permitted in student's rooms and common areas for reasonable periods of time subject to the consent of each resident of a room and the specified residence hall visitation policies for each residential unit.
- P. Motor vehicles may not be stored or maintained at any time in any residence hall area. Bicycles may be retained by the owner in his or her assigned bedroom space, but may not be stored in commons, baths, corridors, entrances, or other residence hall spaces. Motor vehicles and bicycles in unauthorized areas will be removed. Students will be required to pay removal fees in order to recover such vehicles or devices used to secure them. The University assumes no responsibility for damage to such vehicles or devices used to secure them.
- Q. Access to roofs and attic space is forbidden.
- R. Boisterous conduct in violation of the University noise policy is prohibited. Occupants are responsible for the conduct of guests, and any violation of University rules and regulations by a guest shall constitute a violation of same by occupants. Occupants not present during violations will still be held accountable.
- S. Candles or other open flame devices in the residence halls are prohibited unless permission is obtained from Duke University Safety Office upon application in writing and upon presentation of proper justification.
- T. Platforms, partitions, or similar structures may not be erected anywhere in the residence halls by students or living groups without the written approval of the Director of Housing Management or designee. Lofts may be erected only if a loft permit is completed and returned to the appropriate Service Office.
- U. Cable television on the Duke Network is provided in the commons room of each living group. Connecting televisions in bedrooms to the commons room cable or otherwise tampering with the cable is prohibited.
- V. In accordance with the North Carolina State Fire Prevention Code, use of portable charcoal, gas, and electric grills within 10 feet of residence halls is prohibited.

Student Development, Revised 2/93

DUKE UNIVERSITY LICENSE FOR UNDERGRADUATE STUDENTS TO OCCUPY SPACE IN CENTRAL CAMPUS FACILITIES

NAME: _____ SS #: _____

HOME ADDRESS: _____

ASSIGNED LOCATION: _____

PERIOD: from noon _____ to noon _____

Duke University hereby licenses the undersigned to occupy space in the above indicated location and period, subject to the Rules, Regulations, and Other Terms of this Licensing Agreement and all applicable University Regulations. Due to the economics of operating these units, this License will not be revoked to permit students to move to other University housing facilities or to move off campus. *This license automatically terminates if the student officially withdraws, graduates, or ceases for any reason to be a full-time student.*

I have read the Rules, Regulations, and Other Terms of this Agreement, a copy of which has been furnished, under which I may occupy space in University housing and I understand that my continued occupancy is conditional upon my compliance with these terms and all applicable University Regulations. (Attention is especially directed to Part III of the Rules, Regulations, and Other Terms.) If I violate any of these Rules, Regulations, and Other Terms, the University may revoke this License and may refuse to license me for any occupancy period subsequent to the one provided in this License. I further understand that the Rules, Regulations, and Other Terms of this Agreement and University Regulations are subject to reasonable changes. If I have been notified of such changes, the University may revoke this License should I violate any Rules, Regulations, or Other Terms in effect during my occupancy under this License.

Nothing in this License shall be interpreted as relief from the duty to comply with federal, state, and local law, and violation of any applicable law may be reason for revocation of this License.

In consideration of this License, I agree to pay the University according to the schedule of payments for the type of space I occupy as approved by Duke University, a copy of which has been furnished. I understand that, in the event the University revokes this License because I have violated any of the Rules, Regulations, or Other Terms of this Agreement or University Regulations, I must vacate the space I am occupying immediately and the University shall not refund any portion of the payment made for the semester in progress. In the event I officially withdraw, graduate, or cease for any reason to be a full-time student, I agree to vacate the space I am occupying within forty-eight (48) hours. I understand that I will be charged for housing based on the number of days I have occupied that space and will receive a refund for any amount I have paid for housing beyond the time of my departure. The number of days I have occupied the space will be determined according to the date Housing Management inspects the apartment and confirms that my space has been vacated.

(for Duke University)

(Signature of Student)

Date

Date

Student Development, Revised 3/92

RULES, REGULATIONS, AND OTHER TERMS FORMING A PART OF THE LICENSE OF CENTRAL CAMPUS APARTMENTS

The purpose of these Terms is to establish a mutual understanding among students and the University with regard to use of facilities in the Central Campus Apartments. These Rules, Regulations, and Other Terms are an integral part of this License and are enforceable as covenants and conditions of the License. For further information please refer to the Central Campus Handbook.

I. ELIGIBILITY

Units in the facilities are available for assignment to full-time Duke University students who are working towards a degree. Students who withdraw from school or take a leave of absence must vacate the apartment within forty-eight (48) hours from date of such withdrawal or leave.

II. PAYMENTS:

- A. **Prepayment:** A fifty dollar (\$50) prepayment fee must be paid by eligible students who wish to reserve a space in University housing for a subsequent academic year. This prepayment will be credited to the rent for the fall semester. The rent prepayment is not refunded to any student who cancels the housing reservation after the last day of spring semester classes unless the student is involuntarily withdrawn from the University.
- B. **Residential Deposits.** Unless previously paid, a student who wishes to reserve a unit in Central Campus Apartments, must submit a Residential Deposit of one hundred dollars (\$100) to the Dean of Student Development or designee. While a student lives in University housing, it is understood and agreed that his/her Residential Deposit shall not be applied to housing fees. Upon termination of this License and vacating University housing, Duke shall, within ninety (90) days, refund said deposit, less any outstanding fees incurred, in accordance with the established University policy. Charges for damages in excess of the Residential Deposit shall be assessed to the student. The Residential Deposit will not be refunded after an assignment has been made to students who cancel their assignments, forfeit their assignments, or fail to occupy the residential space except in the following instances: (1) A student who has paid a prepayment for a subsequent academic year will receive a refund of the Residential Deposit if written cancellation is received by the Office of Student Development by July 1; (2) A student residing in University housing for the fall semester will receive a refund of the Residential Deposit if written cancellation for the spring semester is received and approved by the Office of Student Development by December 1.
- C. **Keys.** Each resident of a housing unit is required to obtain one key to the unit and one mailbox key at the time of his/her occupancy. The keys must be returned within forty-eight (48) hours of vacating the assigned space. Failure to return the keys within the 48 hour period will result in a charge to the student's bursar's account.
- D. **Housing Fees.** Payments for housing are to be made to the Office of the Bursar before occupancy in accordance with established terms of that office. Payments are to be made on a semester basis.

III. RESERVATION, ASSIGNMENT, SPACE CHANGE, AND CANCELLATION PROCEDURES

- A. Students applying for spaces in Central Campus Apartments who have paid the required residential deposit will be assigned to the apartments by lottery. Undergraduate students who are presently living in University housing will be assigned to apartments in accordance with procedures published by the Office of Student Development.

- B. The number of students to be assigned to various types of units is established by the Department of Housing Management.
- C. Every effort will be made to assign the students in accordance with their preferences. Because this is not always possible, the Dean of Student Development, or designee, retains the authority to make final space assignments.
- D. While the majority of problems incurred between or among roommates can be resolved by the students, with or without assistance, there are cases in which a stalemate occurs. The Office of Student Development will, in those cases, reserve the right to convene an arbitration board to resolve the problem. The decision of the Board is final.
- E. The exchange or transfer of apartments may be made only upon approval by the Dean of Student Development or designee. It is the responsibility of a student vacating space or exchanging apartments to make the apartment ready for the new tenant. The space to be vacated will be inspected by a representative of Housing Management to relieve the vacating student of financial responsibility for damage occurring after the student vacates. Any unofficial apartment change may be reason for revocation of this license and will not relieve the student(s) involved of the obligation to pay occupancy, damage, and other costs for the assigned space.
- F. The Office of Student Development makes no effort to assign individual bedroom space within each unit. That responsibility is left to the assigned occupants.
- G. Units shall not be occupied in whole or in part by any person other than those regularly assigned by the Dean of Student Development. Occupants may not sublet assigned space. Guests are permitted for short periods only, provided all residents of that unit consent.
- H. The Dean of Student Development, or designee, reserves the right to change space assignments if in his/her judgment such change(s) is (are) necessary. This includes relocating a resident from his or her apartment, where there is a vacancy, to another apartment which has a vacancy in order to free a whole apartment for a pair of roommates.

IV. PROCEDURES, MAINTENANCE, STORAGE, AND DAMAGE

- A. Maintenance to buildings, fixtures, utilities, equipment, furniture, and furnishings will be performed on a routine basis; however, corrective emergency and preventive work will be performed as necessary.
- B. Prior to occupancy, the Department of Housing Management will clean each vacant unit and will correct deficiencies. An inspection form will be made available for each apartment. Each assigned student should note on the form the condition of the apartment and furnishings at the time of occupancy to prevent misunderstandings. Instructions on the form must be followed.
- C. Occupants shall maintain the demised premises, the furnishings and equipment therein in good condition and shall be responsible for all broken windows and door glass, the failure of plumbing or equipment caused by misuse and other damage beyond normal wear and tear. In such cases, occupants shall be assessed the cost of materials and labor as invoiced by the Department of Housing Management for repairs, replacements, or reassembly. The Department of Housing Management shall have routine maintenance performed and agrees to make such repairs as may be rendered necessary insofar as the cause thereof does not arise from the willful acts or negligence of the occupant(s). No alteration, addition, or painting may be conducted within the premises by the occupant(s).

- D. Locks and plumbing are not to be tampered with or changed by residents. Additional locks may not be installed.
- E. The University retains the right to enter the premises without the tenant being present for the following reasons: (1) to take care of an emergency or failure of equipment which is causing damage or hazard to property or persons, (2) to conduct inspections to determine availability of space, (3) to carry out routine maintenance, and (4) to ensure that the furnace has been left on and that the thermostats have not been set below 50° during the break between the fall and spring semesters. Furnaces that have been turned off will be turned on and thermostats will be set at 50 degrees by the Department of Housing Management. Entry into the apartment for other reasons will be made during reasonable hours with notice to the assigned occupant(s).
- F. Non-Duke University Housing Management property left in apartments after the license period terminates will be disposed of at the discretion of Housing Management.
- G. The unofficial use or possession of apartment keys, including possession of master keys or keys other than those assigned to the student, is prohibited.
- H. Lost/stolen keys must be reported immediately to the Central Campus Service Office and a replacement key must be obtained. A lost/stolen key will result in a charge to the student's Bursar's account. The lock(s) to the apartment will be changed if the resident is unable to present the lost/stolen key to the Central Campus Service Office within two weeks.
- I. The University is not liable for damage or loss of personal property. Because the University does not provide insurance, occupants are encouraged to provide their own personal property insurance.
- J. The University is not liable for damage, failure, or interruption of utilities. Interruption or curtailment of such services will not entitle the resident to any compensation or abatement of rent.
- K. Furniture or equipment owned by Duke University Housing Management placed in the unit may not be removed from the unit.
- L. Pianos, washing machines, dryers, dishwashers, radio transmitters, external radio or television antennas, and waterbeds are not authorized in these units.
- M. Use of screws, hooks, decals, and adhesive on walls, furniture, or fixtures is prohibited. Small picture hanging nails provided by the Central Campus Service may be used; however, heavy items may not be hung.
- N. Washing of cars in the Central Campus area is prohibited.
- O. No dusting or shaking of mops, brooms, or other cleaning material from the windows, doors, and balconies is permitted.
- P. No fences may be put up around the apartments.
- Q. Outside clotheslines are prohibited.
- R. Access to roofs and attic spaces is prohibited.

V. TERMS AFFECTING RIGHTS, ORDER, HEALTH, AND SAFETY

The following terms are designated to protect the health and safety and to provide for the comfort and privacy of all students who are contracted to occupy units in the Central Campus Apartments. In addition to the Rules, Regulations, and other Terms, any conduct which reflects a serious disregard for the rights, health, security, and safety of other residents will be regarded as a violation of the License.

- A. Combustible materials shall not be stored on the premises. Empty boxes, trash, and other combustibles shall not be stored outside of Central Campus Apartments or Town House Apartments.

- B. Sidewalks, stairways, and entryways must not be used for purposes other than ingress or egress. Bicycles must not be left in these areas or other locations where they may cause harm to persons or groundskeeping equipment. Motorcycles must be parked in parking lots.
- C. Nothing shall be hung from balconies, porches, gutters, or stairwells.
- D. In accordance with North Carolina General Statute 14-269.2, no firearms, explosives, fireworks, highly inflammable materials, or any articles which may be used as offensive weapons may be in the Central Campus facilities. This includes slingshots, clubs, mace, pellet guns, rifles, BB guns, and all firearms and items of like kind.
- E. Tampering with electrical wiring, including but not limited to the installation of direct-wired ceiling fans and dimmer switches, is prohibited.
- F. Delivery trucks, automobiles, motorcycles, scooters, and minibikes will not be permitted on lawns and walkways, patios, or stairwells. These vehicles must be parked in legal parking spaces. Motorcycles, scooters, and minibikes may not be stored in the apartment.
- G. Animals, including but not limited to birds and reptiles, shall not be taken into or kept in or about the units. An extermination, at the resident's expense, will be done if an animal enters the apartment. Fish are allowed provided they are kept in an aquarium no larger than 25 gallons, the container is cleaned regularly, and no illegal species are kept.
- H. Residents shall maintain the areas adjacent to their apartments in a neat and orderly condition. No refuse, loose paper, cans, bottles, etc. shall be permitted to accumulate around the dwelling units. Any packing cases, barrels, or boxes used in moving must be removed by the occupants who are moving. Bulk refuse containers are located throughout the complex.
- I. Campers, trailers, boats, or similar units may not be parked in the parking lots or other areas at the Central Campus Apartments.
- J. Burning candles or other flames are prohibited in University housing.
- K. Any student residing in the apartments who contracts an infectious or contagious disease should immediately report this to the Office of Student Development.
- L. Selling or soliciting on the premises of University housing by residents or outsiders, that is either commercial or unrelated to University objectives or activities, is prohibited.
- M. The apartment must be kept in good order and in a sanitary condition.
- N. Laundry rooms will not be used for storage of personal effects, bicycles or the like. The University is not responsible for clothing lost or stolen from Central Campus laundries.
- O. All users of the Central Campus pool must observe swimming pool regulations published by Housing Management. All persons use the pool at their own risk.
- P. Boisterous conduct in violation of the University noise policy is prohibited. Occupants are responsible for the conduct of their guests, and any violation of these Rules and Regulations by a guest shall constitute a violation of same by occupants.
- Q. Fire extinguishers are placed in each apartment for the safety of occupants and property. Tampering with this equipment, for use or any purpose other than extinguishing fires, is prohibited. Fires must be reported to Public Safety and Housing Management.
- R. In accordance with the North Carolina Fire Prevention Code, use of portable charcoal, gas, and electric grills within 10 feet of Central Campus Apartments or Town House Apartments is prohibited.
- S. Use of HVAC (heating and air-conditioning) closets as storage space is prohibited.

VI. ENERGY CONSERVATION

All residents must comply with energy conservation programs as established by Duke University for residential facilities.

Student Development, Revised 2/93

Appendix B

1994/95 Duke University RESIDENTIAL Dining Plan Contract

All undergraduate students living in campus residence halls must have a dining plan, as required by Duke University policy. Residents of Central Campus Apartments are excluded from this requirement.

A student signing this contract shall be referred to as a participant in the text of the contract detailed below.

TERMS AND CONDITIONS

The participant will have access to the funds in his or her dining account from August 22, 1994 to May 17, 1995. Dining points will be allocated on a semester basis; thus, a participant whose contract is both for the fall and spring semesters will be billed through the university bursar's office prior to each semester. A \$17.50 administrative fee will be charged each semester of the contract period in addition to the dining plan amount.

Unused fall semester dining points will remain in the account for use spring semester; however, spring semester dining points will not be available before the beginning of spring semester. Additional dining points may be added to an existing dining contract at any point during the term of the contract in increments of \$25, with these additions charged to the participant's bursar account. Dining points added in this manner will be subject to the same refund policy as other dining funds (see refund policy, below). (Fall semester contracts are automatically renewed for the spring semester unless changed or cancelled during the Dining Plan change period.)

REFUND/CANCELLATION POLICY

If there are unused dining plan funds in an account at the end of the contract period, the participant will receive a full refund of the first \$50 remaining for each semester during the term of the contract, plus 50% of any additional balance.

A participant who withdraws, takes a leave of absence, or moves off-campus or to Central Campus apartments, as certified by the registrar, Student Development, or the appropriate dean, may cancel this contract by notifying the DukeCard Office. Fall semester contracts canceled after July 1, 1994, will be subject to a \$30 cancellation fee. Spring semester cancellations should be made during the official Dining Plan change period of Monday, September 19 through Thursday, December 1, 1994. No fees will be charged for cancellation of the spring semester portion of the contract during this period. After this period, spring semester contracts can be cancelled only if the participant withdraws, takes a leave of absence, or moves off campus, and a \$30 cancellation fee will apply. A participant moving off campus or to Central Campus apartments may convert to a non-residential dining plan without penalty.

If a participant cancels his or her spring semester contract, dining points left over at the end of fall semester will be refunded according to the \$50+50% rule stated in the first paragraph of this section. Dining points remaining in an account cancelled during either semester, less the \$30 cancellation fee, will be credited to the participant's bursar account.

DINING PLAN CHANGES

No changes to fall semester contracts are permitted after July 1, 1994. Spring semester dining plan contract changes must be made during the official Dining Plan change period of Monday, September 19 through Thursday, December 1, 1994. There is a \$20 fee to change dining plans during this change period or, for fall semester, prior to July 1, 1994. This fee will be waived if the participant changes to a larger dining plan.

If a participant wishes to change or cancel his or her dining plan after these deadlines, he or she must make application to the Duke University Student Dining

Advisory Committee. A participant requesting a change due to religious, financial, or medical reasons will be referred to an appropriate university authority who will determine the legitimacy of the request and make a recommendation to the committee. Decisions of the Duke University Student Dining Advisory Committee are final.

BASIC INFORMATION

Duke University's ID card, the DukeCard, is used by the participant to access his or her dining account. This card must be presented to the cashier at the time of purchase. The participant will receive a statement of all dining plan transactions at approximately 30 day intervals during the term of this contract. Questions concerning transaction records or the status of an account should be referred to the DukeCard Office, 024 West Union Building. Lost DukeCards should be reported immediately to the DukeCard Office at 684-5800 to protect the account from unauthorized use.

Duke Dining Services, a division of Dining and Special Events, reserves the right to determine menu, prices, hours and days of operation for all facilities as well of other operational requirements. The dining plan is nontransferable, either in part or whole. A participant may pay for a guest's transaction only if the participant is present when the purchase is made.

Misuse of the dining plan shall be subject to the provisions of the Duke University Judicial Code.

TO PARTICIPATE:

Please fill out the information below and return this contract with your 1994-95 housing license, or mail to: the DukeCard Office, 024 West Union Building, Box 90911, Duke University, Durham, NC 27708-0911. You will be billed through the bursar's office for the plan you choose.

circle one:

A	B	C	D	E
\$920/semester	\$1,190/semester	\$1,325/semester	\$1,445/semester	\$1,600/semester

term of contract _____ Academic Year
Fall semester contracts renew for spring semester unless
changed or cancelled during the Dining Plan change period.
_____ Spring Semester Only

full name (print) _____ SSN _____

campus mailing address (if known)

I have read the terms of this contract and accept the conditions stated above.

Participant's signature _____ Date _____

Keep the last copy for your records. Do not include payment—you will be billed prior to each semester for the plan you select plus a \$17.50 administrative fee.

1994-95 Duke University NONRESIDENTIAL Dining Plan Contract

This optional contract is offered by Duke Dining Services to students living off-campus or in Central Campus Apartments. A student signing this contract shall be referred to as a participant in the text of the contract detailed below.

TERMS AND CONDITIONS

The participant will have access to the funds in his or her dining account from August 22, 1994, through May 17, 1995. Dining points will be allocated on a semester basis, thus, a participant whose contract is for both the fall and spring semesters will be billed through the university bursar's office prior to each semester. A \$17.50 administrative fee will be charged each semester of the contract period in addition to the dining plan amount.

Unused fall semester dining points will remain in the account for use spring semester; however, spring semester plans must be purchased in full and spring semester dining points will not be available before the beginning of spring semester. Fall semester contracts are automatically renewed for the spring semester unless cancelled during the Dining Plan change period.

Additional dining points may be added to an existing dining contract at any point during the term of the contract in increments of \$25, with these additions charged to the participant's bursar account. Dining points added in this manner will be subject to the same refund policy as other dining funds (see refund policy, below). (A \$17.50 administrative fee will be charged each semester of the contract period in addition to the dining plan amount.)

REFUND/CANCELLATION POLICY

If there are any dining plan points remaining in the account at the end of the contract period, the participant will receive a full refund of the first \$50 remaining in the account for each semester during the term of the contract, plus 50 percent of any additional balance.

This contract may be canceled prior to July 1, 1994 by notifying the DukeCard Office. A participant who withdraws, takes a leave of absence, or moves off campus, as certified by the appropriate university authority, may cancel this contract by notifying the DukeCard Office. Fall semester contracts canceled after July 1, 1994 will be subject to a \$30 cancellation fee.

Spring semester cancellation should be made during the official Dining Plan Change Period of Monday, September 19 through Thursday, December 1, 1994—no fees will be charged during this period. After this period, spring semester contracts can be cancelled only if the participant withdraws, takes a leave of absence, or moves off campus, and a \$30 cancellation fee will apply.

If a participant cancels his or her spring semester contract, any dining points remaining at the end of the fall semester will be refunded according to the 50+50 percent rule in the first paragraph of this section. Dining points remaining in an account cancelled during either semester, less the \$30 cancellation fee, will be credited to the participant's bursar account.

DINING PLAN CHANGES

No changes to fall semester contracts are permitted after July 1, 1994. Spring semester changes must be made during the official Dining Plan change period of Monday, September 19 through Thursday, December 1, 1994. There is a \$20 fee to change dining plans. This fee will be waived if the participant changes to a larger dining plan.

If a participant wishes to change or cancel his or her dining plan after these deadlines, he or she must make application to the Duke University Student Dining Advisory Committee. A participant requesting a change due to religious, financial, or

medical reasons will be referred to an appropriate university authority who will determine the legitimacy of the request and make a recommendation to the committee. Decisions of the Duke University Student Dining Advisory Committee are final.

BASIC INFORMATION

Duke University's ID card, the DukeCard, is used by the participant to access his or her dining account. This card must be presented to the cashier at the time of purchase. The participant will receive a statement of all dining plan transactions at approximately 30 day intervals during the term of this contract. Questions concerning transaction records or the status of an account should be referred to the DukeCard Office 024 West Union Building. Lost DukeCards should be reported immediately to the DukeCard Office at 684-5800 to protect the account from unauthorized use.

Duke Dining Services, a division of Dining and Special Events, reserves the right to determine menu, prices, hours and days of operation for all facilities as well as other operational requirements. The dining plan is nontransferable, either in part or whole. A participant may pay for a guest's transaction only if the participant is present when the purchase is made.

Misuse of the dining plan shall be subject to the provisions of the Duke University Judicial Code.

TO PARTICIPATE

Please select a dining plan and complete the form below. Return this form with your 1994-95 Central Campus housing license or mail to: DukeCard Office, 024 West Union Building, Box 90911, Duke University, Durham NC 27708-0911. You will be billed for the plan you select through the bursar's office.

circle one:

F	A	B	C	D	E
\$315/semester	\$920/semester	\$1,190/semester	\$1,325/semester	\$1,445/semester	\$1,600/semester

term of contract _____ Academic Year
Fall contracts renew for spring semester unless cancelled during the Dining Plan change period.

_____ Spring Semester Only

full name (print) _____ SSN _____

local mailing address (if known) _____

residence: Central Campus Off Campus

I have read the terms of this contract and accept the conditions stated above.

Participant's signature _____ Date _____

Keep last copy for your records. Do not send payment—you will be billed prior to each semester for the plan you select plus a \$17.50 administrative fee.

Appendix C

JUDICIAL SYSTEM OF DUKE UNIVERSITY

Article I: The Judicial System

1.010 The judicial system of the University shall consist of the University Judicial Board and a Judicial Board for each of the communities hereafter defined (see Articles III and IV)

Article II: The University Judicial Board

2.010 Jurisdiction

- a. The jurisdiction of the University Judicial Board shall be limited to cases arising out of the Pickets and Protests Regulations and cases involving more than one of the communities as determined by the Vice-President for Student Affairs in consultation with the Chancellor and the Chairman of the University Judicial Board.
- b. The University Judicial Board shall have jurisdiction over members of the student body, members of the faculty, and administrative personnel of the University not subject to the Personnel Policy Handbook.

2.015 Filing of Charges; Responsibilities of Vice-President for Student Affairs

- a. The Office of the Vice-President for Student Affairs shall have responsibility for receiving complaints, conducting investigations, and preferring charges concerning offenses within the jurisdiction of the board. The University Judicial Board shall hear no case without a finding of probable cause made by the Vice-President for Student Affairs, whose signature to the charge or charges shall constitute sufficient evidence of such finding.
- b. To assist the Vice-President for Student Affairs in the investigation of complaints, the gathering of evidence, and the preparation of charges, investigative and judicial aides may be appointed by the Vice-President and shall serve at his/her pleasure and under his/her direction. The number and specific duties of such aides shall be determined by the Vice-President for Student Affairs, who shall be fully responsible for all duties performed by them in their capacity as aides.
- c. The Vice-President for Student Affairs shall subpoena witnesses as directed by the University Judicial Board.
- d. The Vice-President for Student Affairs may delegate all or any portion of his/her duties as regards these judicial procedures to an aide or aides whose appointment is approved by the Vice-Provost and Dean of Undergraduate Instruction. The Vice-President for Student Affairs shall be responsible for the discharge of all duties thus delegated.

2.020 Membership

The University Judicial Board shall consist of a Chairman appointed by the Chancellor, five faculty members (two of whom shall be from the Law School) appointed by the Executive Committee of the Academic Council, and two student members from each of the communities (except in the case of the undergraduate community where there should be four members) elected by each community's Judicial Board. The Chairman of the Board shall select five-person panels consisting of a Chairman and an equal number of students and faculty. Cases referred to the board shall be assigned to the panels in rotation, provided that a member of a panel may, at his/her request, be excused from sitting

on a case by the Chairman of the Board, who may appoint a substitute from among the other members of the board. Each panel shall be known as a "Hearing Committee of the University Judicial Board."

2.030 Terms of Members

Faculty members shall normally serve for two-year terms, but are eligible for reappointment. The terms should be staggered in order to provide continuity. Two of the initial appointees shall be appointed for one-year terms. Student members shall serve for one-year terms, although they may be eligible for re-election. The board has the right to remove any member of the board for cause by a vote of a two-thirds majority of all members. The vacancy shall be filled promptly according to the original procedure.

2.040 Conduct of the Hearing

- a.* The hearing will be conducted in private unless the accused requests an open hearing. If any objection is raised to conducting an open hearing in any particular case, the Hearing Committee of the University Judicial Board will decide the issue by majority vote. If the decision is made not to hold an open hearing, the accused shall be informed in writing of the reasons for the decision.
- b.* The University and the accused may be represented by an adviser of his/her choice.
- c.* The board shall promulgate its own rules of procedure consistent with academic due process and all provisions of this document.
- d.* The accused has the right to challenge on the grounds of prejudice any member of the Hearing Committee sitting on his/her case. If an accused makes such a challenge, the Hearing Committee shall deliberate in private to determine whether cause exists. By a majority vote of the members of the tribunal (excluding the member being challenged), a member shall be removed from the case and replaced by a member of the board designated by the Chairman of the Judicial Board. In addition, the accused may exercise a challenge directed at the entire panel, in which case the challenge shall be made to the Chairman of the University Judicial Board, who shall excuse the panel challenged and refer the accused's case to the next panel in rotation.

2.050 The Right of Appeal

- a.* In cases heard by the University Judicial Board, there will be no appeal when the accused is acquitted.
- b.* A student or administrator who is not a member of the faculty convicted by the University Judicial Board may appeal to the President, or in his/her absence, the Provost, in which case such appeal shall be solely on the record of the proceedings before the Hearing Committee. Argument or appeal shall be on written submission, but the President may, in addition, require oral argument.
- c.* A member of the faculty convicted by the University Judicial Board may appeal to the Faculty Hearing Committee authorized under the provisions for Academic Freedom and Tenure of Duke University.

2.060 Status of the Accused

Charges must be prepared without delay following the alleged commission of the offense. Pending final verdict on charges against the accused (including appeal), his/her status shall not be changed, nor his/her right to be on campus to attend classes suspended, except that the Chancellor or Provost may impose an interim suspension upon any member of the University community who demonstrates, by his/her conduct, that his/her continued presence on the campus constitutes an immediate threat to the

physical well-being or property of the members of the University community or the orderly functioning of the University. The imposition of interim suspension requires that the suspended individual shall immediately observe any restriction placed upon him/her by the terms of the suspension. The suspended individual shall be entitled to a hearing within three (3) days before the Hearing Committee on the formal charges. If he/she requires additional time to prepare his/her case before the Hearing Committee, he/she shall be entitled to an informal review of the decision imposing interim suspension by a three-person committee chosen from the members of the University Judicial Board by its Chairman. Interim suspension is an extraordinary remedy which will be invoked only in extreme cases where the interest of the University and members of its community require immediate action before the Hearing Committee can adjudicate formal charges against the suspended individual. If interim suspension is imposed and the accused is later found innocent, the University shall seek restitution as provided by the Hearing Committee with respect to the student's academic responsibilities incurred during the period of suspension.

2.070 Civil and Criminal Courts

Members of the University community may be subject to civil or criminal proceedings in a local court. The Chancellor may initiate legal action seeking injunctive or other civil relief, or file criminal charges, when it is necessary to protect the person or property of members of the University community, or the orderly functioning or property of the University. Such action may be in addition to the filing of formal charges before the University Judicial Board and/or interim suspension.

2.080 Sanctions

- a. A Hearing Committee of the University Judicial Board shall have the power to impose the following penalties upon students:
 1. *Expulsion*. Dismissal from the University with the recommendation that the person never be readmitted.
 2. *Suspension*. Dismissal from the University and from participation in all University activities for a specified period of time after which the subject may apply for readmission.
 3. *Suspended Suspension*. Penalty (2), suspended because of unusual mitigating circumstances. In a period of time specified, conviction before the University Judicial Board, or before one of the community Judicial Boards may result in suspension.
 4. *Disciplinary Probation*. Placing a student on a probationary status for a specified period of time, during which conviction of any regulation may result in more serious disciplinary action.
 5. *Exclusion from participation in extracurricular activities*. Without limiting the generality of that penalty, such restrictions might involve participation in any collegiate athletics, or any public participation or performance in the name of the University. However, a Hearing Committee may not exclude a person from performance of the duties of an elective office, but may make such a recommendation to the appropriate organization. This penalty may be imposed by itself or in addition to any of the other enumerated penalties.
 6. *Censure*. Written reprimand for violation of the specified regulation, including the possibility of more severe disciplinary sanction in the event of conviction for the violation of the same or one of equal seriousness within the period of time stated by the reprimand.
 7. *Admonition*. By an oral statement to the offender that he/she has violated the University rules or has been in contempt of the board.

8. *Restitution.* Payment for all, or a portion of property damage caused during the commission of an offense. This penalty may be imposed by itself, or in addition to any of the other penalties.
 9. *Fines.* Payment of reasonable sums to be determined by a Hearing Committee. This penalty may be imposed by itself, or in addition to any of the other penalties.
 10. Exclusion from social activities where the nature of the violation so indicates including, but not limited to, curfews or other revocation of upperclass privileges.
- b. A Hearing Committee of the University Judicial Board shall have the power to impose the following penalties upon faculty members and administrative personnel not subject to the provisions of the Personnel Policy Handbook.
1. Dismissal. Dismissal or termination of appointment.
 2. Censure.
 3. Admonition.
 4. Restitution.
 5. Fines.

2.085 Other Powers

The Hearing Committee may recommend to the University that it seek restitution with respect to the accused's University responsibilities incurred during a period of suspension or during the period when a hearing has been conducted or shall make such other nonpunitive recommendations with respect to the accused as it shall deem appropriate.

2.090 Records

The board shall promptly arrange a policy of keeping its own records, subject to the University policy on confidentiality.

2.095 Excusal of Members of the University Community from University Obligations

Any member of the University community whose presence is required at a hearing shall be excused from the performance of any University responsibilities which would normally be performed at the time when his/her presence is required before the Hearing Committee.

2.096 Revocation of Probation or Suspended Suspension

In the event that a student has been placed on suspended suspension or disciplinary probation by the University Judicial Board and subsequently is convicted of a violation of a regulation by any other University tribunal, the suspension of his/her suspension or the revocation of his/her probation will not automatically occur. In such a case the student shall be entitled to a hearing being limited to the issue of whether his/her probation should be revoked or whether he/she should be suspended as the result of the original conviction and the conduct which gave rise to the second conviction.

Article III: Community Judicial Boards

3.010 Community Judicial Boards

There shall be an undergraduate community consisting of the undergraduates in Trinity College of Arts and Sciences and the School of Engineering; a Divinity School community consisting of all students in the School of Divinity; a Law School community consisting of all students in the School of Law; a Medical School community consisting of all students in the School of Medicine; an Allied Health community consisting of all

degree and certificate (i.e., paramedical, nondegree) students in the School of Allied Health; a Forestry and Environmental Studies School community consisting of all students in the School of Forestry and Environmental Studies; and a Graduate School community consisting of all students in the Graduate School. Except as hereafter provided for the undergraduate community, each community shall have such judicial system as its governing body may provide.

Article IV: The Undergraduate Community

4.010 The Undergraduate Judicial Board

A (1) *Board Established.*

There is established an Undergraduate Judicial Board, hereinafter denoted as the board.

A (2) *Membership.*

The board shall have thirty-five (35) members. Fifteen (15) will be from among the undergraduates, twelve (12) will be from among the faculty (Trinity College and the School of Engineering), and eight (8) will be from among the deans in the undergraduate school and college.

A (3) *Selection of Undergraduate Members.*

Student members of the board will be chosen from among interested rising juniors and seniors as follows:

- a. Interested candidates will apply for positions by completing written forms devised by the board.
- b. The candidates will subsequently take an objective-type written questionnaire on the several aspects of the undergraduate judicial system.
- c. Those obtaining a passing score, as defined by the board, are deemed eligible for interviews.
- d. Interviews will be conducted by senior student members of the board and one representative of the Undergraduate Student Government appointed by the Chief Executive Officer of that government.
- e. From among those interviewed, one nominee shall be recommended for each vacancy together with a total of three (3) alternates.
- f. All those nominated are subject to approval by the legislature of the Undergraduate Student Government as advised by a representative of the board in attendance.
- g. At every stage of this process, consideration shall be given to the appointment of at least one student from the undergraduate school and college.
- h. Except that interim members as provided for in A(6) who have served for at least one (1) semester during their junior year will become regular members of the board for the following academic year as a matter of course.

A (4) *Selection of Faculty Members.* Faculty members of the board will be appointed by the duly empowered committee of the Undergraduate Faculty Council of Arts and Sciences through the Dean of Trinity College and by the Dean of the School of Engineering.

A (5) *Selection of the Dean Members.* Appointees will be deans in the undergraduate school and college, but will not include the Dean of Student Development, or the Vice-President for Student Affairs, including their assistants.

- A (6) *Selection of Interim Members.*
- a. Interim undergraduate vacancies on the board are to be filled through nomination(s) of one or more of the previously designated alternates by a concurrent vote of two-thirds (2/3) of the full board membership and subsequent approval by the legislature of the student government.
 - b. Interim faculty vacancies are to be filled by the duly empowered committee of the Undergraduate Faculty Council of Arts and Sciences.
 - c. Any undergraduate member of the board who takes a leave of absence while remaining in good standing in the University will resume, upon return, the place previously vacated on the board.
 - d. Interim members will serve only to the end of the regular academic year whereupon the position held will be vacated and filled in the manner prescribed in A(3) through A(5).
 - e. But interim members serving during leaves of absence of regular members will terminate their duties and return to their former status as alternates upon return to service of that regular member.
- A (7) *Removal of Members.* The board may remove any member for cause by a two-thirds (2/3) majority of the full board. The vacancy so created will be filled forthwith in the manner prescribed in A(6).
- B (1) *Terms of Undergraduate Members.* Undergraduate members of the board will ordinarily serve during good behavior for terms not exceeding two years.
- B (2) *Terms of Faculty and Dean Members.* Faculty and dean members will serve two-year terms, subject to reappointment upon consent. To insure staggered terms, they may be appointed for a single year.
- C (1) *Board Organization:* The full board will elect, by majority vote, a Chairman and Vice-Chairman, both of whom must be undergraduates.
- C (2) *Board Calendar.*
- a. *Regular Terms.*
The board or parts thereof will ordinarily hear and dispose of all pending cases in which charges have been preferred, during the regular fall and spring semesters, and following the end of spring semester.
 - b. *Summer Session Terms.*
 1. The Chairman will ascertain the local availability of board members for summer session service and those within a 200 mile radius who may be invited by the Dean of Student Development to serve at University expense.
 2. The Chairman of the Undergraduate Judicial Board will provide the Dean of Student Development with a roster of board members available for service on the Undergraduate Judicial Board during all or any portion of the summer sessions.
 3. The Dean of Student Development will constitute a five (5) member Hearing Committee from this list, appoint a chairman and provide an ordinary hearing committee including at least one (1) faculty member and two (2) students.
 4. If the number of student members drawn from the rosters provided under C(2)(b.) (2) above is insufficient to constitute the hearing panel provided for in C(2)(b.) (3) above, the Dean of Student Development, with consent of the Chief Executive Officer of the Undergraduate Student Government, will appoint the necessary number of students drawn from the undergraduate student body.

5. The Summer Session Hearing Committee will function in the same manner and with the same procedure as a Regular Term Hearing Committee, except that the accused may not enjoy more than one (1) peremptory challenge.

C (3) *Duties of Officers.*

- a. The Chairman, Vice-Chairman, or their designee, will preside over any meeting of the board or any meeting or hearing of a part thereof.
- b. The Chairman will maintain a roster of available members for the regular and summer session terms. See C(2).
- c. The Chairman and the Dean of Student Development or his/her designee will prepare a "Semester Report of the Undergraduate Judicial Board" to be issued in January and May. It will be a statistical survey designed to order cases: by volume, classification, disposition, and current status (e.g., filed, pending, heard, on appeal to Dean or to Vice-President for Student Affairs).
- d. The Chairman and the Office of Student Development will prepare and issue an "Annual Report of the Undergraduate Judicial Board" to be compiled following adjournment of the board at the end of the spring semester. The contents will contain:
 1. A listing, by types of cases, of abstracts of all completely adjudicated cases.
 2. A statistical survey of the business of the board during the preceding academic year.
 3. A commentary on that business.
 4. Any recommendations which the board wishes to make.
 5. The "Annual Report" will be released prior to freshman registration in the fall semester and will constitute the basis of an early fall semester interview with the *Chronicle* to be held by the Chairman.
- e. The Chairman and/or Vice-Chairman, as well as a representative of the Office of Student Development, will attend one meeting of UFCAS at the beginning of either semester to discuss the concerns of the board in relation to the faculty and the concerns of the faculty in relation to the board.
- f. The Chairman and/or Vice-Chairman, as well as a representative of the Office of Student Development, will call a meeting with the Directors of Undergraduate Studies (DUS) at both the beginning and the end of each academic year. The DUS shall serve as the liaison between the UJB and the faculty. The DUS will:
 1. Apprise the faculty of the topics and issues covered in his/her meetings and with the Chairman and/or Vice-Chairman,
 2. Receive copies of the board's opinions for all academic dishonesty cases and keep the opinions on file for faculty perusal,
 3. Consult with faculty members in his/her department when academic dishonesty violations appear to have been committed. Records should be maintained of:
 - number of students suspected
 - number of students confronted
 - number of students referred to the UJB
 - number of students disciplined by the faculty member (action taken)
 4. Encourage faculty to use the UJB when appropriate, and
 5. Contact the Office of Student Development and/or board members, who will be available for consultation, when he/she or a faculty member wishes to discuss any matter relating to the UJB.

- D (1) *Hearing Panel Organization.* Hearing panels will consist of seven (7) members as assigned by the Dean of Student Development in consultation with the

Chairman or Vice-Chairman. Each hearing panel will consist of four (4) undergraduates, two (2) faculty members, and one (1) dean. One student member will be designated as Chairman of the panel.

- D (2) *Modified Hearing Panel Organization.* In the interest of speedy disposition, a panel of reduced size may be convened, but in no panel shall it consist of fewer than five (5) members appointed by the Dean of Student Development in consultation with the Chairman or Vice-Chairman. Each such panel will consist of three (3) undergraduates, one (1) faculty member, and one (1) dean.
- D (3) *Substitution of Hearing Panel Members.* Any member of a panel may, at his or her request, be excluded by the Chairman of the Board from sitting on any case. The Chairman of the Board will thereupon appoint a substitute member from among the relevant class of members of the board.
- E (1) *Jurisdiction.* The board will exercise jurisdiction over cases:
 - a. In which the accused is a named student
 - currently enrolled in, or
 - not yet matriculated to, or
 - readmitted to and not yet matriculated to programs of the undergraduate college or school.
 - b. In which the accused is a residential or nonresidential cohesive unit, as represented by an officer or regular member.
 - c. Which fall without the jurisdiction of the University Judicial Board.
 - d. Which fall within the classification of offenses stipulated in the Judicial Code of the undergraduate community (see pages 38-40) and the University Regulations and Policies (see pages 40-61) in this bulletin.
- F *Functions of Dean of Student Development.*
- F (1) The Dean of Student Development or designee is responsible for receiving complaints, conducting investigations, gathering evidence, and preparing and preferring charges relating to offenses within the jurisdiction of the board.
- F (2) The Dean of Student Development may appoint assistants, in such numbers and for such duties under his/her supervision in order to faithfully execute his/her responsibilities, as the Dean shall deem convenient and useful.
- F (3) The Dean of Student Development is responsible for maintenance of the records of the board. These records include:
 - 1. A public permanent precedent file provided by panels. It consists of abstracts specifying charges, facts, case dispositions and rationales for such dispositions. Identification of the party or parties as well as of witnesses will be omitted.
 - 2. A permanent confidential case file.
- F (4) The Dean of Student Development or his/her designee, jointly with the board, is responsible for recruitment, training, supervision, and direction of a staff of advisers available to accused students.
- G *Prehearing Procedures.* Upon receipt of a complaint, the Dean of Student Development or duly appointed assistants will:

- G (1) Promptly assemble and examine all evidence either material or relevant to the allegation in which task the Dean or the Dean's assistant shall enjoy prompt and full cooperation from all parties concerned. This investigatory process may include, but is not confined to:
- a. Receipt of any oral and/or written evidence including documents and records.
 - b. Interviewing the accused which interview must begin with notification by the Dean or assistant of: a right to remain silent, a right to an adviser as defined herein, a right to waive knowingly one or both of these rights as well as a written and signed acknowledgment by the accused attesting to an understanding of these rights (Cf. I(8)(a)).
 - c. Interviewing any holder of evidence.
 - d. Receipt from the accused of a written statement submitted in his or her behalf which document will become part of the case record.
- G (2) Promptly determine on the basis of the preliminary investigation whether or not there exists probable cause for believing that the accused person committed the alleged act(s).
- G (3) The Dean of Student Development is responsible for finding of probable cause. In determining whether to prefer charges against any accused, the Dean will consider:
- a. *Civil proceedings completed.* If, in the judgment of the Dean of Student Development, any civil or criminal liability the accused may have already incurred by reason of the action of any civil tribunal adequately vindicates the interest of the University in punishment of the accused, the Dean shall not prefer charges against the accused. The Dean shall, however, report to the Judicial Board finding of probable cause and reasons for not preferring any charge.
 - b. *Civil proceedings pending.* If any civil or criminal action is pending in any civil tribunal, and in the judgment of the Dean of Student Development, prompt trial before the Judicial Board would be prejudicial and unreasonably burdensome to the accused in respect to the civil tribunal proceedings, notwithstanding the finding of probable cause, the Dean of Student Development may defer preferring any charge. In making this determination, the Dean will consider the nature of the offense, the nature of the defense that may be offered in either the civil or University proceeding, the punishment that may be visited on the accused in either proceeding, the likely delay in the civil proceedings, any possible impairment of the accused's ability to defend him/herself in either proceeding by reason of its contemporaneous pendency and the preservation of general peace and order within the University community. If, after a finding of probable cause, the Dean of Student Development decided either to defer preferring charges or definitely to abandon them in the situations covered by this paragraph, the Dean shall nevertheless report to the Judicial Board his/her findings of probable cause and reasons for deferring or abandoning the preferring of charges.
 - c. *Civil proceedings in future.* If any civil or criminal action is threatened or likely, the Dean of Student Development will be governed by the same considerations set forth in paragraph (b.), and in addition by the degree of likelihood of civil or criminal proceedings against the accused. If, after a finding of probable cause, the Dean of Student Development decided either to defer preferring charges or definitely to abandon them, in the situations covered by this paragraph, the Dean shall nevertheless report to the Chairman of the Judicial Board the finding of probable cause and reasons for deferring or abandoning the preferring of charges.

- G (4) In circumstances so warranting under G (3) a.-c. the sanction of interim suspension may be invoked. (See K (13)).
- G (5) *Referral.*
- a. The Dean of Student Development may refer the case to the appropriate agency for resolution if that officer finds that the case, whether or not probable cause exists, falls without the board's jurisdiction.
 - b. At any time prior to imposition of verdict and sanction, any member of a panel may object to further consideration of the case on grounds that the board lacks jurisdiction. Thereupon the panel must resolve the jurisdictional question raised. If a panel majority believes the board lacks jurisdiction over the case, the proceedings will be suspended, and the matter referred to the Chairman of the Board for subsequent resolution of the question by the full Undergraduate Judicial Board. The decision of a majority of those board members present will be final, and the case will be either retained by the board accompanied by referral back to the original panel or be referred to the appropriate agency for disposition.
- G (6) *Terminate action and report this fact if:*
- a. No probable cause is found.
 - b. After examination of the Undergraduate Judicial Code and the University Regulations, it is determined that commission of the alleged act does not violate any provision(s) found in the duly promulgated codes, rules, and regulations of the University.
 - c. In the event that the Dean of Student Development should refuse or fail for any reason to receive complaints and/or conduct investigations, and/or find probable cause and/or prefer charges, an aggrieved party may appeal such action or inaction on grounds of new or different evidence previously unavailable. This step may be made by filing with the Chairman of the Board a typed petition entitled: "Petition to Find Probable Cause." Upon receipt of this petition, the Chairman of the Board will direct the Dean or will unilaterally appoint an investigator to find facts on the basis of which a full seven (7)-member hearing panel may determine the existence of probable cause sufficient to warrant a regular hearing in due course.
- G (7) *Probable Cause Notice: Undergraduate Judicial Board Hearings.* If probable cause is determined to exist, the Dean of Student Development will promptly draw up a written notice to be transmitted to the accused together with a summons to appear for a panel hearing at the time and place specified. The notice will include:
- a. The charges.
 - b. Referral to text of the relevant provision(s) of the Judicial Code, rules, and regulations.
 - c. Any additional evidence produced during the investigative process.
 - d. A statement of procedural rights available to the accused.
 - e. Any other material which the board may instruct the Dean of Student Development to supply the accused.
 - f. The signature of the Dean of Student Development or appointed assistants.
 - g. List of members of the panel designated to hear the case.

- G (8) *Probable Cause: Administrative Hearings.* Should the Dean of Student Development, after consulting with the Chairman of the Undergraduate Judicial Board, determine that either the nature or related extenuating circumstances of a case render it amenable to the administrative hearing alternative provided for in H(1)(b.), a written notice will include explicit notice of the availability of such forum to an accused who still may opt for his/her right to a formal hearing before the Undergraduate Judicial Board. Administrative hearing decisions are final; no appeals may be taken from them with the exception of a sanction of suspension or expulsion. (See Section L.)
- G (9) Prepare a written report of findings and transmit that report to the appropriate tribunal. This report will contain a copy of the probable cause notice (G (8)), all evidence gathered in the preliminary investigations, with its sources and statement of the rights of the accused. Nowhere in this report will a personal opinion be expressed as to the merits of any evidence, or as to the guilt or innocence of the accused. However, where there are conflicts in the evidence the Dean will draw the attention of the panel to them. The report shall become a part of the written record of the hearing.
- G(10) Subpoena witnesses as directed by the Chairman of the hearing panel.



H(1) *Administrative Hearings.*

- a. For academic dishonesty violations, an accused may request that his/her case be heard by the appropriate Dean of his/her college or school, who may refuse to hear it. In all nonacademic violations, the accused may request that his/her case be heard by the Dean of Student Development and/or that officer's designee(s) as specified in G(8). In fixing the sanction, the Dean or designee(s) is(are) governed by all penalties enumerated in Section K of the code. Administrative hearing decisions are final; no appeals may be taken from them with the exception of a sanction of suspension or expulsion. (See Section L.)
- b. The Dean of Student Development and/or that officer's appointee(s) will confer at the earliest convenient time with an accused who met the requirements specified in G(8).
- c. The Chairman of the Board will receive prompt notification of hearings held under (a) and (b) above and a copy of the case abstract as defined in J(14)(b.).

I *Undergraduate Judicial Board Prehearing Procedures.*

I(1) *Charge required.*

- a. No case may be heard by the board in the absence of a finding of probable cause by the Dean of Student Development and a clear statement of the charges against the accused or by direct petition to the board. (Cf. G(7) and G(6)c)
- b. The Dean's signature on the Probable Cause Notice (G(7)) attests to a sufficiency of inculpatory evidence, existence of the board's jurisdiction, and the completeness of the charges.

I(2) *Hearing Schedules.* The hearing, based on contents of the Probable Cause Notice (G (8)) will take place speedily, ordinarily within thirty (30) days following presentation of charges to the accused.

I(3) *Notice.* The accused will be given at least forty-eight (48) hours notice prior to the hearing or prior to continuation of a hearing recessed under J(8) subject to waiver as provided for in I (4).

I(4) *Waiver.* The accused may waive by a signed written statement the notice and/or the forty-eight (48) hour rule with reference to I (3) above and I(11)b) below.

I(5) *Continuances.* Should the accused desire additional time to prepare his or her defense, a petition to that effect may be directed to the Chairman of the Board not less than twenty-four (24) hours prior to the scheduled hearing. In the Chairman's discretion, the accused may be granted a hearing delay of reasonable duration.

I(6) *Contempt.* A willful or deliberate action on the part of the accused to impede, obstruct, unduly delay, or interfere at any stage with, in any manner, the proceedings then or thereafter before or potentially before the board may be deemed an act or acts in contempt of the board as determined by a majority of the relevant panel after issuance of a "show cause" order and in a separate regular proceeding held notwithstanding failure of the accused to appear in defense. K(12).

I(7) *Removal and Challenges.*

- a. *Voluntary Removal.* Board members may excuse themselves from a hearing panel for any reason (see D(3)).

- b. *Recusal.* No person presenting evidence against the accused may at any time sit in judgement upon the accused.
- c. *Challenges.*
 - 1. *For Cause.* The accused has the right to challenge on the grounds of prejudice any member of the hearing panel sitting on his/her case. If an accused makes such a challenge, the panel shall deliberate in private to determine whether cause exists. By majority vote of the members of the panel (excluding the member being challenged), a member shall be removed from the case, and replaced by a member of the board designated by the Chairman of the Board.
 - 2. *Peremptory.*
 - a. In addition, the accused may exercise a peremptory challenge directed at not more than seven (7) panel members even if a new trial on an amended charge is required. (Cf J(8)d).
 - b. At the time the accused is informed of the hearing date, he/she shall be presented with a list of the members of the panel designated to hear the case.
 - c. If the accused wishes to make a peremptory challenge(s), he/she shall make the challenge(s) in writing to the Office of the Dean of Student Development within forty-eight (48) hours of the notification of the scheduled time of the hearing.
 - d. The Office of the Dean of Student Development will transmit this challenge to the Chairman of the Board, who will excuse the panel challenged, and refer the accused to the next panel in rotation.
 - e. The accused retains the right to challenge for cause whether or not he or she has used the seven (7) peremptory challenges except as noted in C(2)b and C(5).

I(8) *Adviser*

- a. *Right to Adviser.* The accused enjoys the right to have an adviser. The Dean of Student Development will assign the accused an adviser at notification of the investigation. The accused may decline the assigned adviser and may select any other member of the University community except members of the board, or the accused may select no one. (G(1)b).
- b. The function of the adviser is to advise the accused in the preparation and presentation of his or her case, but the adviser may not directly address the panel nor any other participants during the formal hearing proceedings.
- c. Witness or witnesses as defined in I(10)a may request the panel chairman to permit the presence of adviser during hearing proceedings under conditions enumerated in I(8)a and b.

I(9) *Role of Accused.*

- a. *Presentation of Case.* The accused enjoys the right and will be advised of the right to produce witnesses, introduce documents, and offer testimony in his or her own behalf. The accused may present no more than two written character references to be submitted to the hearing panel prior to the hearing.
- b. *Testimonial Rights.*
 - 1. The accused enjoys the right against self-incrimination, the right to remain silent respecting the charges brought against him/her, before, during, and after the hearing. No inference of guilt may be drawn from the silence.
 - 2. But any evidence pertinent to the charges volunteered by the accused may be used as evidence against him/her.
 - 3. If the accused elects to offer testimony on a specific act of misconduct, he/she waives a right to continued silence, and must answer truthfully all questions pertaining to the act.

- c. *Examination of Witnesses.*
 - 1. Under the supervision of the panel chairman, the accused may question directly any witness.
 - 2. The moving party or the accused, with or without the adviser's assistance, may submit questions in writing to the chairman of the hearing panel or during the proceedings.
 - 3. The chairman must ask such question(s) so submitted unless they are unfair and/or irrelevant and/or purely capricious.
 - 4. A copy of the written questions will be appended to the record.

I(10) *Witnesses.*

- a. *Defined:* Any person with direct knowledge relevant to a case pending before the board is a material witness.
- b. *Duty to Appear.* The Dean of Student Development may require the appearance of material witnesses or, upon the written request of the complainant and/or the accused, the Dean will require the appearance of such witnesses.
- c. *Notice to.* The Dean of Student Development will notify such witness(es) in writing of the time, place, and purpose of their appearance as well as of the right against self-incrimination.
- d. *Contempt of.* Willful and deliberate failure and/or refusal of any material witness to honor a subpoena authorized by the board and duly served by the Dean of Student Development or a representative may be deemed an act in contempt of the board.

I(11) *Discovery.*

- a. *No extrinsic evidence.* In reaching its judgment, a panel will consider only the report of the Dean of Student Development, documents submitted into evidence, and the testimony of: moving party(ies), accused, and witnesses at the hearing.
- b. The accused has the right to examine the written statement of any witness which is relevant to the case at least forty-eight (48) hours prior to either the hearing or continuation of a hearing recessed under J(8) subject to waiver as provided for in I(4).
- c. *Confrontation.* The accused has the right to confront any witness who has given a statement relevant to the pending case.
- d. *Excuse priority.* Any student whose presence is required at a hearing will be excused from any other University responsibility which might prevent, impair, or delay his/her presence before a panel, and both the board and the Dean of Student Development will employ their good offices to assist such students in making satisfactory arrangements.

I(12) *Closed Hearings.* The hearing will be closed unless the accused requests an open hearing. If any objection to an open hearing is lodged, the panel will decide the issue by majority vote and, if negative, the accused will receive from the panel a written statement of reasons for rejection of his/her request.

J *Hearing Procedure.*

J(1) *Opening.* The Chairman will open the proceedings by noting the date, identity of the party(ies), the charges, and identity of all panel members.

J(2) *Plea.* The accused will then plead guilty, not guilty, guilty in part and not guilty in part, or move to postpone the hearing for good cause shown.

- J(3) *Report of the Moving Party.* At this time, the Chairman may invite the moving party(ies) to make a statement, not to exceed five (5) minutes, summarizing the essential facts and expressing opinions thereon. At any point prior to this stage of the hearing, the moving party(ies) may decline such invitation.
- J(4) *Case for Accused.* The Chairman of the panel will request the accused to present his or her case. (See I(7)c(1) and I(7)c(2), I(8)b, I(9).) The accused may waive this right by a verbal declaration (See I(9)b.)
- J(5) *Witnesses.*
- a. All witnesses will be sequestered at the commencement of proceedings and will appear before the panel consecutively. But the panel Chairman may suspend this rule and direct attendance of all witnesses in the hearing room.
 - b. The accused may call and direct questions to witnesses as prescribed in I(9)a and c, respectively.
 - c. The panel may call and question witnesses.
- J(6) *Examination of Witnesses.*
- a. Under the supervision of the panel chairman, the accused may question directly any witness.
 - b. The moving party or the accused, with or without the adviser's assistance, may submit questions in writing to the Chairman of the hearing panel before or during the proceedings.
 - c. The Chairman must ask such question(s) so submitted unless they are unfair and/or irrelevant and/or purely capricious.
 - d. A copy of the written questions will be appended to the record.
- J(7) *Evidentiary Rules.*
- a. All evidence which the panel considers relevant will be admitted including hearsay and expressions of opinion.
 - b. Wherever possible oral testimony rather than written statements should be presented.
 - c. Statements made by unidentified witnesses or those absent at the hearings, neither of which can be confronted by the accused, may not constitute a sole or substantial basis for conviction.
 - d. No evidence obtained through unlawful search and seizure or in violation of the University Statement on the Privacy of Students' Rooms will be admissible at the hearing.
- J(8) *Recess and Termination of Hearings.*
- a. The Chairman may recess hearings for a short duration of time in order to facilitate the work of the panel.
 - b. By vote of a majority of the panel members, hearings may be recessed for an extended duration of time in order:
 1. to accommodate extraordinary circumstances such as personal emergencies
 2. to acquire additional evidence or testimony
 3. to provide adequate time for considering and setting sanctions (see: I(3) and I(11)b.)
 - c. A witness or accused enjoys the right to a brief recess after a lapse of one (1) hour from commencement of the official record as provided for in J(14)a.

- d. However, no recess may be declared for the purpose of amending the original charges against the accused. If it is determined during the hearing and prior to verdict and judgment that the charges must be amended,
 - (1) with the unanimous consent of the hearing panel and the agreement of the Accused, the charge(s) may be amended and the hearing may continue, or
 - (2) without the unanimous consent of the hearing panel or the agreement of the Accused, the hearing must be terminated without prejudice and the procedures set forth in Section I reinstated.
- J(9) *Status of Accused Pending Verdict and Appeal (Interim Suspension).* Pending verdict on charges (including appeal) against the accused, the status as a student cannot be changed, nor the right to be on campus or to attend classes suspended, except as provided for by the interim suspension rule (K(13)).
- J(10) *Verdict and Sanction.*
- a. After the hearing closes, the panel will consider its verdict and sanction in closed session.
 - b. The verdict is a determination of guilt or innocence. A guilty verdict is based on the existence of clear and convincing evidence that the accused committed the act(s) alleged in the charge.
 - c. The sanction is a statement of the punishment imposed drawn from those enumerated in Section K below.
 - d. Verdict and sanction will be determined by a majority vote of a panel except that any judgment of expulsion (see K(1)) or suspension (see K(2)) must be concurred in by not less than four (4) members of a five (5) member panel nor less than five (5) members of a seven (7) member panel.
- J(11) *Special Master.* At any stage in the proceedings, involving complicated technical or professional subject matter, and at the request of any party or any or all members of a panel, a special master may be appointed by the Chairman of the Board in consultation with the appropriate dean. The special master will render advice to the panel. On the motion of any party or any member of the panel, proceedings may be recessed pending the receipt of the special master's report.
- J(12) *Rehearing.* A panel by a majority vote may decide to rehear a case in which significant new evidence can be introduced in behalf of the accused.
- J(13) *Notification of Verdict and Sanction.*
- a. The Chairman of the panel will promptly inform in writing the Dean of Student Development of the decision of the panel, but initial notification may be oral followed by the written abstract as required by J(14)b.
 - b. The Chairman of the panel or the Dean shall promptly notify the defendant of the verdict and sanction imposed, and shall, at the same time, inform him or her of rights of appeal.
 - c. At the request of the moving party(ies), the Dean of Student Development may, but is not required to, inform that person or persons of the panel's verdict and/or sanction.
- J(14) *Record:*
- a. *Tapes:* A separate tape recording will be made for each hearing, clearly labelled, and retained for three (3) years.
 - b. *Abstract:* A written abstract of each case will be made by completion of a "Hearing Committee Report Form" signed by the panel chairman.

- K *Sanctions.* The board is empowered to impose singly or in combination penalties of four (4) classes.

CLASS I

- K(1) *Expulsion.* Dismissal and permanent removal from the University without possibility of readmission or reinstatement. University censure automatically applies.

- K(2) *Suspension.*

- a. Under the voting rules set forth in J(10)d, dismissal from membership in the University for a specified period of time, ordinarily including the current semester and the next succeeding one, and such additional semesters as deemed appropriate by the panel.
- b. The privilege of a residential or of any other cohesive unit to exist at Duke University may be suspended or revoked.
- c. Readmission or reinstatement as a student or residential or cohesive unit in good standing is contingent upon satisfaction of any conditions stated in the original sanction.
- d. Upon a student's reacceptance to and matriculation in the University or the reinstatement of a residential or cohesive unit to the University, the student or residential or cohesive unit is placed on disciplinary probation K(4) for a specified period of time.
- e. As suspension constitutes an involuntary withdrawal from the University, an entry to that effect is made on the student's permanent academic record or the residential or cohesive unit's citizenship record for the duration of the suspension.
- f. Residential or cohesive units may be suspended for a specified time period from one or more enumerated activities sponsored, cosponsored, or performed by said residential or cohesive unit.
- g. University censure (class II) may be applied as determined by the panel.

- K(3) *Suspended Suspension.*

- a. For a specified period of time, the penalty of suspension is imposed, but suspended due to the existence of facts deemed mitigating by a panel.
- b. A disciplinary probation period must run concurrently and may run consecutively with suspension.
- c. As no involuntary withdrawal actually occurs, no temporary entry to that effect is made on the student's permanent record.

- K(4) *Probation.*

- a. *Disciplinary Probation.* Placing the student or residential or cohesive unit on a probationary status for violation of any regulation may result in suspension if adjudged guilty of subsequent infraction.
- b. *Revocation of Disciplinary Probation.* In the event that a student or residential or cohesive unit has been placed on disciplinary probation by the Undergraduate Judicial Board and subsequently is convicted of violation of a regulation by the University Judicial Board, the revocation of his/her/its probation will not automatically occur. In such a case he/she/it shall be entitled to a hearing before a panel of the Undergraduate Judicial Board, said hearing being limited to the issue of whether his/her/its probation should be revoked as the result of the original conviction and the conduct which gave rise to a second conviction.

- K(5) *Exclusion.*
- a. from public participation or performance in the name of the University other than performance of duties as an elective officer.
 - b. from application for, retention of, or any other possession of a University housing license.
 - c. from access to, use of, and occupation of specified University-owned premise and/or facilities.
 - d. from application for, retention of, or any other possession of a traffic and parking permit.
 - e. from application for, retention of, or any other possession of IM privileges.
- K(6) *Warning.* A formal written admonition but which explicitly states the certainty of a more severe disciplinary sanction for conviction of a subsequent violation during a stated period. A warning may be entered on the student's Dean's card citizenship record or on the residential or cohesive unit's citizenship record at the discretion of a panel.
- K(7) *Restitution.* Payment for all or a portion of injury or damages to person(s) or property caused by commission of an offense.
- K(8) *Fine.* Payment to Duke University of a reasonable sum of money set by a panel which may also impose a community service sanction as provided for in K(9)a or b below.
- K(9) *Community Service.* Specified hours of service set by a panel during which period a student or residential or cohesive unit will perform as either
- a. a regular employee in the University student labor pool, or
 - b. a "volunteer" worker in a charitable enterprise in Durham city or county as arranged for and supervised by the Dean of Student Development.

CLASS II

- K(11) *University Censure.*
- a. Official entry on a student's permanent record, of serious misconduct including both the fact of the censure and the exact nature and circumstances of the offense.
 - b. This sanction is never applied unless in combination with serious offenses meriting imposition of sanction K(1)-(2). Censure indicates the seriousness of the offense and the absence of mitigating circumstances.
 - c. Application of this sanction requires a separate vote of a panel under J(10)d unless accompanying Expulsion K I(l).

CLASS III

- K(12) *Temporary Exclusion.* Exclusion from registration, enrollment, or matriculation at the next ensuing semester, including semesters of summer session or eligibility to graduate from Duke University pending relief from verdict and sanction by compliance in good faith with the original order, directive or subpoena. This penalty is ordinarily used in contempt proceedings described in I(6) and I(10)d.
- K(13) *Interim Suspension.*
- a. An extraordinary remedy invoked only in extreme cases requiring immediate action prior to a panel hearing.
 - b. If the Dean of Student Development deems any student's presence on campus, at any time, to constitute a threat to the general peace and order of

the University community and to its several members, that officer may so notify the Provost or Chancellor, who may, in his or her discretion, suspend the named student from the University for a three (3)-day period pending a hearing before a duly constituted panel of the board.

- c. If the student or board requires a continuance, the interim suspension may be extended by the Provost or Chancellor or by a duly constituted panel of the board.
- d. If interim suspension is imposed and the accused is later found innocent, the University will grant restitution as provided by the Undergraduate Judicial Board with respect to that student's academic responsibilities incurred during the period of suspension.

K(14) *Temporary Restraining Order.*

- a. A formal written ex parte order issued by
 - (1) a duly constituted panel, or
 - (2) the Dean of Student Development in consultation with the Chairman of the Board where possible, directing a named actor(s) to cease and desist from engaging in behavior deemed contrary to one or more provisions of the Undergraduate Code. [See I(6) and K(12)].
- b. Such TROs are of twenty-one (21) days duration but are renewable only through regular panel proceedings.

CLASS IV

K(15) *Counseling Recommendation.* If a panel majority believes that a student would benefit from professional counseling, it may recommend such action to the Dean of Student Development who may so advise the student.

L *Appeal.*

L(1) *Right of Appeal.*

- a. Appellant may appeal any verdict and sanction of the board to the dean of the relevant undergraduate college or school in any case involving academic dishonesty. In all cases involving infractions other than academic dishonesty appellant may appeal the verdict and sanction of the board to the Vice-President for Student Affairs.
- b. After consideration by one of the following,
 - (1) the Dean of the appropriate college or school, or
 - (2) the Vice-President for Student Affairs, or
 - (3) the designee of either of the above appellant officers, the second level of appeal shall be the President of the University.

L(2) *Form and Time of Notice to Appeal.* Notice of appeal must be in writing and submitted to the relevant dean, unless waived by him/her, within forty-eight (48) hours after receipt of the verdict and judgement.

L(3) *Form and Time of Actual Appeal.* A written statement clearly and briefly setting forth grounds for appeal must be submitted to the relevant dean, unless waived by the officer within seven (7) days after receipt of the verdict and sanction.

L(4) *Exclusive Grounds for Appeal.*

- a. Procedural error substantially affecting the rights of the accused.
- b. Incompatibility of the verdict with the weight of the evidence.
- c. New evidence of a character which may have affected the verdict but on which basis rehearing was denied by the board.

d. Proven case of extreme personal hardship as a result of the board's action.

L(5) *Appeal Procedures.*

- a. The relevant administrative officer of the University may not hear testimony de novo.
- b. With the consent of an appellant, the administrative officer may consult with other members of the University community as he/she chooses only to substantiate the grounds for appeal. (See L(5)a.)
- c. He/she shall receive documents submitted by the panel including tapes, abstracts, written opinions, and dissents.
- d. The appellant may prepare for his/her defense with the assistance of an adviser and may at his/her expense make a transcription of the tape.
- e. The appellant must submit a written statement setting forth grounds for his/her appeal as required by L(3) and the supporting arguments.
- f. The appellant has a right to make an oral statement to the dean to amplify his/her written arguments. This administrative officer may question the defendant at this time about his/her oral statement or written statement, but shall confine himself or herself to the issues on appeal. These additional statements and arguments shall be recorded.
- g. Either the chairman of the relevant hearing panel or the administrative officer charged with the responsibility for hearing the appeal may request a conference between themselves to consider issues arising out of the case. A notation of substantive issues discussed in any such conference shall likewise be incorporated in the record.
- h. In cases where a hearing panel's verdict and/or sanction is reversed, the hearing panel may request a conference with the appellant officer responsible for the reversal.

L(6) *Appeal to President.* The appellant may appeal an unfavorable decision of the administrative officer to the President of the University who may, in his or her discretion, entertain such appeal under such conditions and with such procedures as he or she may prescribe. The President will notify the Board Chairman of the decision.

L(7) *Notification.*

- a. In all cases the relevant administrative officer or President of the University will submit to the Chairman of the Board, with a copy to the Dean of Student Development a written statement of the decision and reasoning on which it is based.
- b. Such administrative officers will promptly communicate their decision to the appellant.
- c. The appellant officer will inform the moving party(ies) of the outcome of his/her decision.

M *Amendment of Article IV.*

M(1) Article IV, "The Undergraduate Judicial Board," may be amended at any time by the Vice-President for Student Affairs only on the recommendation of a permanent Advisory Committee on Judicial Codes composed of undergraduates, faculty, and deans appointed by and acting under that officer's supervision and direction.

M(2) All amendments promulgated by the Vice-President for Student Affairs shall be effective from and after the date of promulgation.

Appendix D

PICKETS, PROTESTS, AND DEMONSTRATIONS

Statement of Policy. Duke University respects the right of all members of the academic community to explore and to discuss questions which interest them, to express opinions publicly and privately, and to join together to demonstrate their concern by orderly means. It is the policy of the University to protect the right of voluntary assembly, to make its facilities available for peaceful assembly, to welcome guest speakers, to protect the exercise of these rights from disruption or interference.

The University also respects the right of each member of the academic community to be free from coercion and harassment. It recognizes that academic freedom is no less dependent on ordered liberty than any other freedom, and it understands that the harassment of others is especially reprehensible in a community of scholars. The substitution of noise for speech and force for reason is a rejection and not an application of academic freedom. A determination to discourage conduct which is disruptive and disorderly does not threaten academic freedom; it is rather, a necessary condition of its very existence. Therefore, Duke University will not allow disruptive or disorderly conduct on its premises to interrupt its proper operation. Persons engaging in disruptive action or disorderly conduct shall be subject to disciplinary action, including expulsion or separation, and also charges of violations of law.

Rule. Disruptive picketing, protesting, or demonstrating on Duke University property or at any place in use for an authorized University purpose is prohibited.

Hearing and Appeal. Cases arising out of violations of the Pickets and Protests Regulations will be heard by the University Judicial Board, in accordance with the procedures outlined in Appendix C, pages 82-102. The University Judicial Board shall have jurisdiction over members of the student body, members of the faculty, and administrative personnel of the University not subject to the Personnel Policy Handbook. Hearings will be conducted with regard for academic due process. The decision of the University Judicial Board shall be final if the accused is exonerated or if there is no appeal. In other cases, students may appeal to the President, or, in his/her absence, the Provost, in which case such appeal shall be solely on the record of the proceedings before the Hearing Committee of the University Judicial Board. Argument on appeal shall be on written submission, but the President may, in addition, require oral argument.

A Hearing Committee will consist of two faculty members, one dean, and two students. These students will be selected from members of the judicial boards or governments in the undergraduate, graduate, or professional colleges or schools. The Chairman of the Hearing Committee will be designated by its members.

The Hearing Committee will conduct its proceedings in accordance with academic due process.

The decision of the Hearing Committee shall be final if the accused is exonerated or if there is no appeal. In other cases appeal may be taken to the President, in which case such appeal shall be solely on the record of the proceedings before the Hearing Committee. Argument on appeal shall be written submission, but the President may in addition require oral argument.

The procedures for faculty members will follow the arrangements provided under the *Personnel Handbook*.

Amendments. These regulations on pickets, protests, and demonstrations may be changed or amended by the University at any time but any such change or amendment shall be effective only after publication or other notice. These regulations supersede any regulations heretofore issued on the subject.

Appendix E

RULES GOVERNING DRUG VIOLATIONS

I. Rules governing drug violations at Duke University are as follows.

- 1 Alleged violations of the policy stated in the first paragraph of the drug policy on page 50 will be adjudicated by the Undergraduate Judicial Board or appropriate deans, or in the case of nonstudents, by comparable authorities and their appointed delegates. It is expected that professional judgment will be exercised in referring indicated cases to University health and counseling services in keeping with the second and third paragraphs of the policy on page 50.
2. The two grounds which may constitute occasion for the assessment of penalties are:
 - a. conviction of a member of the University on a drug charge by a court of law.
 - b. a finding with the appropriate University tribunal, in conformity with the principle of due process, of sufficient evidence that a member of the University has violated the drug policy.
3. The maximum penalty to be imposed within the University upon a student for possession or use of marijuana shall be suspension; for the possession or use of other illegal drugs, or the distribution of any illegal drug, the maximum penalty of the University is expulsion. Other members of the University shall be liable to appropriate comparable penalties.

II. Rules governing drug violations of student-athletes at Duke University are as follows.

Duke University prohibits drug use by its student-athletes. Prohibited drugs will include anabolic steroids and other performance-enhancing drugs, narcotics and other illegal drugs, and any other drug banned by the National Collegiate Athletic Association (NCAA) legislation. The NCAA requires every student-athlete to consent to be tested for prohibited drug usage. But, unlike some other institutions, Duke University will not impose drug testing on all student-athletes. To do so would unfairly single out a group of students who are no more likely to use drugs than any other group of students and could contribute to the perpetuation of unfortunate and inaccurate stereotypes. Duke University will not require any student-athlete to submit to testing except (i) in compliance with NCAA regulations for NCAA championships and postseason football contests; (ii) on a random basis for performance-enhancing drugs (e.g., anabolic steroids) only; or (iii) where a coach or the Director of Intercollegiate Athletics has a reasonable and articulable suspicion that the student-athlete has used a prohibited drug. In the event that a coach or the athletic director has a reasonable and articulable suspicion that a student-athlete has used a prohibited drug and requests that the student-athlete submit to testing, the student-athlete who refuses to undertake the test, or tests positive for a prohibited drug, may be denied permission by his or her coach to represent the University in intercollegiate events or participate in team practices. The student-athlete also may be subject to additional sanctions, including loss of athletically-related financial aid for subsequent semesters. Any student-athlete dissatisfied with a determination to reduce or cancel his or her financial aid will have an opportunity to appear at a hearing before, and appeal such a determination, to the Academic Committee of the Athletic Council.

Duke University is committed to a policy of helping any student-athlete who recognizes that he or she has a drug problem and asks for help. The first time a student-athlete voluntarily seeks help for a drug problem, the appropriate official in the athletic department will provide confidential counseling or other assistance required by the student-athlete, including medical and drug rehabilitation assistance at the University's expense. Unless medically indicated, a first-time drug user will remain eligible

to represent the University in intercollegiate events and participate in team practices. His or her coach will not be informed of the drug problem.

If drug use recurs, and a student-athlete again voluntarily seeks help for a drug problem, the appropriate official in the athletic department will endeavor to assist the student-athlete. The matter will be brought to the attention of the Director of Intercollegiate Athletics. The athletic director may determine in his discretion whether medical and drug rehabilitation assistance sought or needed by a repeat user should be paid for by the University; whether the student-athlete will remain eligible to represent the University in intercollegiate events or participate in team practices; whether the student-athlete's coach will be informed of the drug problem; and whether the student-athlete will be subject to additional sanctions, including loss of athletically-related financial aid for subsequent semesters.

Staff members and others employed by the athletic department who have knowledge of the use of a prohibited drug by a student-athlete are under an affirmative duty to report such usage to the student-athlete's coach or the athletic director.

The effective date of this policy is July 1, 1986. Each student-athlete of Duke University will receive a copy of this policy annually.

HEALTH EFFECTS OF ALCOHOL, TOBACCO, OTHER DRUGS

One class of drugs is most frequently used socially or recreationally—the psychoactive drugs. These drugs are used because of the pleasurable feelings and the altered state of consciousness they induce. Psychoactive drugs act on the central nervous system—more specifically the brain. They may increase its activity (stimulants, such as cocaine, crack, amphetamines), decrease its activity (depressants, such as alcohol, barbiturates, tranquilizers), cause the creation of illusions (hallucinogens, such as LSD, peyote, shrooms, PCP), or have a combined effect (marijuana). Every drug has multiple effects on the brain and the body. Addiction to any of these substances is a disease which affects the addict mentally, emotionally, physically, and spiritually. It can also have a profound effect on those closest to the addicted person.

Short Term Abuse

Impaired judgement (violent behavior, physical injuries, accidents), unpredictable mood swings, halitosis, risky sexual behaviors (unplanned pregnancy, impaired sexual response, sexually transmitted diseases), sexual assault, rape, hangovers, increased nervousness, tremors, shortness of breath, reduced energy and stamina, digestive problems (nausea, vomiting, diarrhea, ulcer irritation), dehydration, cardiovascular changes, seizures, loss of consciousness, death.

Long Term Abuse

Systemic Disorders. Increased heart rate, increased or sudden decrease in blood pressure, hyper-activity, decreased oxygen in blood supply to the brain, decreased immune system function, AIDS or hepatitis from needle sharing, reverse tolerance, hemorrhage, delirium tremens (D.T.s) from acute withdrawal, death.

Brain/Central Nervous System Disorders. Short-term memory loss, concentration difficulties, damaged nerve connections, disruption of "chemical messengers."

Mental Health Disorders. Sleep disorders, eating disorders, fatigue, acute or chronic depression, hallucinations, acute psychotic episodes, suicidal thoughts/gestures/actions, personality changes, delusional states, anxiety/panic reactions, psychosis.

Respiratory System Disorders. Painful nosebleeds, nasal erosion, tuberculosis, chronic lung diseases including emphysema and chronic bronchitis, exacerbation of sinus and asthma conditions, increased risk of lung cancer, decreased vital lung capacity.

Digestive Disorders. Ulcers in the mouth, diseases of the gums, inflammation of the esophagus, stomach, and pancreas, ulcers, cirrhosis, fatty liver disease, alcoholic hepatitis.

Sexual/Reproductive Disorders. Impotence, atrophy of testicles, impaired sperm production, absence of menstrual period, decrease in desire/arousal/performance, birth defects.

Endocrine/Nutrition/Metabolic Disorders. Malnutrition, vitamin/mineral deficiencies, acute gout, obesity, diabetes, decreased testosterone levels in men, appetite disorders, weight gain or loss, impaired immune system.

Skin and Subcutaneous Tissue Disorders. Skin infections, unsightly changes in the skin, dry skin, boils, skin abscesses, itching, increase in skin moles and benign skin tumors, spider angiomas, edema.

Pregnancy and Fetal Development. Fetal Alcohol Syndrome, low birthweight babies, increased risk of miscarriage, stillbirth, increased risk of Sudden Infant Death Syndrome, brain damage, congenital deformities, addiction in the newborn.

Other Disorders. Prone to cross addiction to other drugs including prescription medications, laxatives, analgesics, and caffeine. Additionally, chronic abusers have an increased incidence of fractures, sprains, burns, lacerations, bruises, concussions, and other traumas.

CAMPUS AND COMMUNITY ALCOHOL, TOBACCO, AND DRUG RESOURCES

Emergency Phone Numbers

911 — Alcohol-related emergencies are often difficult to assess. If there is any question of a student's safety, or the student has: (1) passed out, (2) vomited, (3) consumed most of a fifth of hard liquor in one to two hours, or (4) consumed alcohol in combination with other drugs, **IMMEDIATELY CALL THE STUDENT INFIRMARY'S 24-HOUR PHONE NUMBER: 684-3367**

If an intoxicated student can't be aroused, has suffered an injury, or seems to be in a life-threatening state, get the student to the **DUKE HOSPITAL EMERGENCY DEPARTMENT. THE E.R.'S 24-HOUR PHONE NUMBER: 684-2413**

Duke Public Safety can assist in transporting students to the Student Infirmary or the Emergency Department. **PUBLIC SAFETY PHONE NUMBER: 684-2444**

24-hour confidential advice on alcohol or drug-related emergencies can be obtained through the **EMERGENCY CARE PSYCHIATRIC NURSE (DURHAM COUNTY GENERAL HOSPITAL)** at 470-4000; or through **OAKLEIGH TREATMENT** at 470-6600.

INPATIENT TREATMENT

Oakleigh at Durham	470-6600
309 Crutchfield Street	
Durham, NC 27704	1-800-782-1113
Charter Northridge	1-800-447-1800
400 Newton Road	
Raleigh, NC 27615	

OUTPATIENT TREATMENT

Duke Alcoholism and Addictions Program	684-3850
2213 Elba St. (Civitan Building)	
Box 3074, Duke University Medical Center	
Durham, NC 27710	

Oakleigh at Durham 470-6600
309 Crutchfield Street
Durham, NC 27704

INDIVIDUAL COUNSELING

Duke Student Health—Substance Abuse Services 684-3620
Alcohol and Other Drugs —Jeanine Atkinson X332
Tobacco—Linda Carl X242
Healthy Devil Health Center, 113 House O

Duke Alcoholism and Addictions Program 684-3850
2213 Elba Street (Civitan Building)
Box 3074, Duke University Medical Center
Durham, NC 27710

Durham County Substance Abuse Services 560-7500
705 S. Mangum Street
Durham, NC 27701

SUPPORT GROUPS

Alcoholics Anonymous (AA) (286-9499). AA offers emergency support for alcoholics, in addition to their group meetings. Many have found that the 12 step program is the most helpful method of getting sober. There are AA groups near campus. Call Jeanine Atkinson at 684-3620, x332 for location/date/time.

Narcotics Anonymous (NA) (560-7500). This support group is for recovering drug abusers/addicts, or those who are currently abusing drugs, or members of their families, or friends. The 12 steps are used in this program. (919) 755-5391

ACOA/AL-ANON (684-3620). An ACOA/AL-ANON group is a self-help for family members group based on the 12-step model which focuses on dealing with the impact of living with or being close to an alcoholic. There are also ACOA/AL-ANON groups in Chapel Hill. The North Carolina Association for Children of Alcoholics is an information and referral service. (919) 851-3119.

INFORMATION/EDUCATION

Duke Student Health Education (684-3620). The Healthy Devil Health Education Center, 113 House O, offers a wide variety of information on alcohol, tobacco, other drugs, how to help a friend, decision-making and more. This walk-in service also provides videotapes, films, and books. Individual or group consultation, information, assessment, and referral appointments can be scheduled by calling the Substance Abuse Specialist at Health Education, 684-3620, x 332. Confidentiality is ensured.

Counseling and Psychological Services (660-1000). Counseling and Psychological Services (CAPS) is available for evaluation, consultation, and referral for substance abuse.

P.I.C.A.D. 660-DRUG. Peer Information and Counseling on Alcohol and Drugs, a Duke student peer group, offers information, education, consultation, and referral services. They are also available for group presentations. PICAD is located in House O, Room 113.

North Carolina Alcoholism Resource Center (493-2881). Offers an impressive array of free brochures on alcohol and other drugs, plus listings of area treatment and self-help resources, including information on AA, NA, AL-ANON, NAR-ANON, and other support group meeting places and times.

1-800-COCAINE. An around-the-clock information and referral service, staffed by recovering cocaine addict counselors.

N.I.D.A. 1-800-662-HELP

For information in Spanish: 1-800-66AYUDA

A hotline maintained by the National Institute of Drug Abuse offers confidential information and referral.

N.C.A.D.I. (1-800-729-6668). The National Clearinghouse for Alcohol and Drug Information offers free print information on alcohol and other drugs.

Cancer Information Service (1-800-4-CANCER). Free telephone smoking cessation counseling, materials, support, referrals.

American Lung Association (1-919-834-8235). Self help materials available.

American Cancer Society (490-5785). Fresh Start smoking cessation programs, self help materials.

Federal Trafficking Penalties

As of November 18, 1988

CSA	PENALTY		Quantity	DRUG	Quantity	PENALTY	
	2nd Offense	1st Offense				1st Offense	2nd Offense
I and II	Not less than 10 years. Not more than life. If death or serious injury, not less than life.	Not less than 5 years. Not more than 40 years. If death or serious injury, not less than 20 years. Not more than life.	10-99 gm or 100-999 gm mixture	METHAMPHETAMINE	100 gm or more or 1 kg ¹ or more mixture	Not less than 10 years. Not more than life. If death or serious injury, not less than 20 years. Not more than life.	Not less than 20 years. Not more than life. If death or serious injury, not less than life.
			100-999 gm mixture	HEROIN	1 kg or more mixture		
			500-4,999 gm mixture	COCAINE	5 kg or more mixture		
			5-49 gm mixture	COCAINE BASE	50 gm or more mixture		
			10-99 gm or 100-999 gm mixture	PCP	100 gm or more or 1 kg or more mixture		
			1-10 gm mixture	LSD	10 gm or more mixture		
			40-399 gm mixture	FENTANYL	400 gm or more mixture		
10-99 gm mixture	FENTANYL ANALOGUE	100 gm or more mixture					
	Drug	Quantity	First Offense		Second Offense		
	Other ²	Any	Not more than 20 years If death or serious injury, not less than 20 years, not more than life Fine \$1 million individual, \$5 million not individual		Not more than 30 years If death or serious injury, life Fine \$2 million individual, \$10 million not individual		
III	All	Any	Not more than 5 years Fine not more than \$250,000 individual, \$1 million not individual		Not more than 10 years Fine not more than \$500,000 individual, \$2 million not individual		
IV	All	Any	Not more than 3 years Fine not more than \$250,000 individual, \$1 million not individual		Not more than 6 years Fine not more than \$500,000 individual, \$2 million not individual		
V	All	Any	Not more than 1 year Fine not more than \$100,000 individual, \$250,000 not individual		Not more than 2 years Fine not more than \$200,000 individual, \$500,000 not individual		

¹Law as originally enacted states 100 gm. Congress requested to make technical correction to 1 kg

²Does not include marijuana, hashish, or hash oil (See separate chart)

Federal Trafficking Penalties—Marijuana

As of November 18, 1988

Quantity	Description	First Offense	Second Offense
1,000 kg or more; or 1,000 or more plants	Marijuana Mixture containing detectable quantity*	Not less than 10 years, not more than life. If death or serious injury, not less than 20 years, not more than life. Fine not more than \$4 million individual, \$10 million other than individual.	Not less than 20 years, not more than life. If death or serious injury, not less than life. Fine not more than \$8 million individual, \$20 million other than individual.
100 kg to 1,000 kg, or 100-999 plants	Marijuana Mixture containing detectable quantity*	Not less than 5 years, not more than 40 years If death or serious injury, not less than 20 years, not more than life. Fine not more than \$2 million individual, \$5 million other than individual.	Not less than 10 years, not more than life. If death or serious injury, not less than life. Fine not more than \$4 million individual, \$10 million other than individual.
50 to 100 kg	Marijuana	Not more than 20 years. If death or serious injury, not less than 20 years, not more than life. Fine \$1 million individual, \$5 million other than individual	Not more than 30 years. If death or serious injury, life. Fine \$2 million individual, \$10 million other than individual.
10 to 100 kg	Hashish		
1 to 100 kg	Hashish Oil		
50-99 plants	Marijuana		
Less than 50 kg	Marijuana	Not more than 5 years. Fine not more than \$250,000, \$1 million other than individual.	Not more than 10 years. Fine \$500,000 individual, \$2 million other than individual.
Less than 10 kg	Hashish		
Less than 1 kg	Hashish Oil		

*Includes Hashish and Hashish Oil

(Marijuana is a Schedule I Controlled Substance)

Appendix F

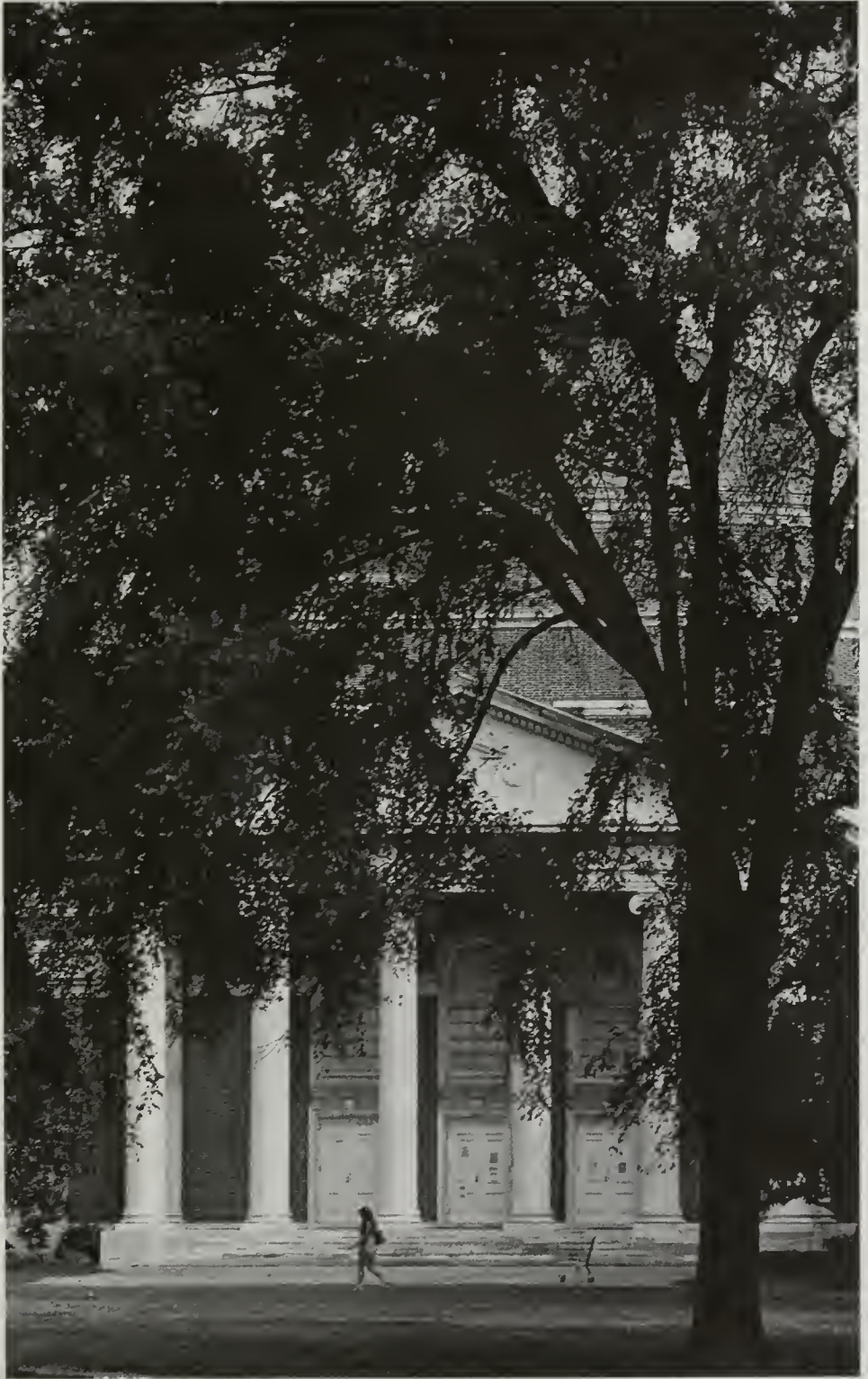
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DUKE UNIVERSITY REGULATIONS CONCERNING PAYMENTS OF ACCOUNTS

Basic University policy requires that tuition and mandatory fees be paid in full prior to the beginning of each semester whether an invoice has been received or not. As part of the agreement of admission to Duke University, a student is also required to pay all monthly invoices for any additional charges as presented. These tuition payment plans will offer an alternative for payment of a portion of the charges billed each year. The *Monthly Payment Option* provides an opportunity to pay tuition, room, and board in ten (10) installments. The *Guaranteed Tuition Plan* (freshmen only) finances and guarantees the amount and rate of tuition for four (4) years through forty-four (44) equal installments (seven [7] semesters through thirty-nine [39] installments for January freshmen) financed at 9 1/2 percent interest. The *Prepaid Tuition Plan* guarantees tuition charges for four years of undergraduate study at the freshman rate. If full payment or arrangement for payment through the two plans is not received, a penalty charge as described below will be assessed on the next monthly invoice and also certain restrictions as stated below will be applied.

Late Payment Penalty Charge. If the "Total Amount Due" on an invoice is not received by its due date, the next invoice will show a penalty charge of 1 1/4 percent per month assessed on the past due balance regardless of the number of days past due. The "Past Due Balance" is defined as the previous balance less any payments and credits received on or before the due date and also less any student loan memo credits related to the previous balance which appear on the invoice.

Restrictions. An individual will be in default of this agreement if the "Total Amount Due" on the student invoice is not paid in full by the invoice due date. An individual who is in default will not be allowed to register for classes, receive a transcript of academic records, have academic credits certified, be granted a leave himself of absence, or have a diploma conferred upon graduation. In addition, an individual in default may be subject to withdrawal from school.



Telephone Numbers Frequently Used

ADMISSIONS	684-3214
Belvin, James—Director of Undergraduate Financial Aid	684-6225
BRYAN CENTER INFORMATION DESK	684-2323
Bryant, Martina—Associate Dean/Social Science/Trinity College	684-2075
BURSAR	684-3531
CAREER DEVELOPMENT CENTER	660-1050
Christmas, William—Director of Student Health	684-6721
COUNSELING AND PSYCHOLOGICAL SERVICES	684-5100
Cox, Richard—Associate Vice-President/Student Affairs	684-5363
CULTURAL AFFAIRS	684-5578
Dickerson, Janet Smith—Vice-President/Student Affairs	684-3737
Dowell, Earl—Dean of the School of Engineering	660-5389
DSG (Duke Student Government)	684-6403
Eldridge, Albert—Registrar	684-3146
EMERGENCY	911
ENGINEERING, SCHOOL OF	660-5386
FINANCIAL AID	684-6225
Friedrich, John—Chairman of Department of Health, Physical Education, and Recreation	684-2202
HOUSING MANAGEMENT	684-5226
HEALTH, PHYSICAL EDUCATION, AND RECREATION	684-2202
INTERNATIONAL HOUSE	684-3585
Johns, Christa—Assistant Dean/Social Science and Study Abroad/Trinity College	684-2174
Keul, Norman—Assistant Dean/Pre-Majors/Trinity College	684-6217
Lattimore, Caroline—Assistant Dean/Social Science/Trinity College	684-3924
MINISTER TO THE UNIVERSITY	684-2177
MINORITY AFFAIRS	684-6756
Moorman, Jane Clark—Director of Counseling and Psychological Services	660-1000
Nijhout, Mary—Associate Dean/Natural Sciences/Trinity College	684-6536
OFFICE OF STUDENT ACTIVITIES	684-2163
PAGE BOX OFFICE	684-4059
PUBLIC SAFETY	684-2444
Shepard, Marion—Associate Dean/Engineering	660-5387
Singer, Kay—Assistant Dean/Natural Sciences/Premed Advisor/ Trinity College	684-6221
Starnes, Marian—Bursar	684-3531
STUDENT ACTIVITIES	684-2163
STUDENT AFFAIRS	684-3737
STUDENT DEVELOPMENT	684-6313
STUDENT HEALTH	684-6721
Thomason, Fidelia—Director of Housing Management	684-5226
TRINITY COLLEGE	684-3465
UNION	684-2911
Wasiolek, Suzanne—Dean, Student Development	684-6313
White, Richard—Dean of Trinity College	684-3465
Willimon, William—Dean of the Chapel	684-2177
Wilson, Gerald—Senior Associate Dean/Trinity College/Prelaw Advisor	684-2865
Wittig, Ellen—Associate Dean/Humanities/Trinity College	684-5585
EMERGENCY-911	



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bulletin of
Duke University
1993-95

Graduate Nursing Program



bulletin of
Duke University
1993-95

Graduate Nursing Program

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Duke University does not discriminate on the basis of race, color, national and ethnic origin, handicap, sexual orientation or preference, gender, or age in the administration of educational policies, admission policies, financial aid, employment, or any other university program or activity. It admits qualified students to all the rights, privileges, programs, and activities generally accorded or made available to students. For further information, call Leonard Beckum, Equal Opportunity Officer, 919-684-4736.

Information that the university is required to make available under the Student Right to Know and Campus Security Acts may be obtained from the Office of University Relations at 919-684-2823 or in writing at 615 Chapel Drive, Duke University, Durham, North Carolina 27708.

The information in the bulletin is accurate and current to the best of our knowledge, as of October 1993. The university reserves the right to revise programs, academic requirements, lectures, teaching staffs, the announced university calendar, and other matters described in the bulletin without prior notice, in accordance with established procedures. Whenever changes occur, an effort will be made to notify persons who may be affected.

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School of Nursing Calendar 1993-1994

Fall 1993

August		
23-26	Monday-Thursday.	Registration of new and nonregistered returning graduate students.
24	Tuesday.	9:00 A.M. Orientation of new students.
30	Monday.	8:00 A.M. Fall semester classes begin; Drop/Add continues.
31	Tuesday.	School of Nursing fall semester classes begin.
September		
10	Friday.	Last day for graduate Drop/Add.
October		
15	Friday.	Last day for reporting midsemester grades.
15	Friday.	6:00 P.M. Fall break begins.
20	Wednesday.	8:00 A.M. Classes resume.
23	Saturday.	Registration begins for spring semester 1994.
29-31	Friday-Sunday.	Homecoming.
November		
5-7	Friday-Sunday.	Parents' Weekend.
19	Friday.	Graduate registration ends for spring semester 1994.
24	Wednesday.	12:30 P.M. Thanksgiving recess begins.
24	Wednesday.	Last day for N350 and N351 defense.
29	Monday.	8:00 A.M. Classes resume.
December		
3	Friday.	6:00 P.M. Graduate classes end.
12	Sunday.	Founders' Day.
13	Monday.	Final examinations begin.
18	Saturday.	Final examinations end.

Spring 1994

January		
3	Monday.	Registration of new and nonregistered returning graduate students.
6	Thursday.	8:00 A.M. School of Nursing spring semester classes begin; graduate Drop/Add begins.
19	Wednesday.	Graduate Drop/Add ends.
February		
18	Friday.	Last day for reporting midsemester grades.
March		
4	Friday.	6:00 P.M. Spring recess begins.
14	Monday.	8:00 A.M. Classes resume.
19	Saturday.	Registration begins for fall semester 1994 and for summer 1994.
April		
8	Friday.	Registration ends for fall semester 1994; and continues for summer 1994.
8	Friday.	Last day for N350 and N351 defense.
11	Monday.	Graduate Drop/Add begins.
15	Friday.	6:00 P.M. Graduate classes end.
25	Monday.	Final examinations begin.
30	Saturday.	Final examinations end.
May		
6	Friday.	Commencement begins.
7	Saturday.	7:00 P.M. School of Nursing Honors and Recognition Service.
8	Sunday.	Graduation exercises; conferring of degrees.



University Administration

GENERAL ADMINISTRATION

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Janet Smith Dickerson, M.Ed., *Vice-President for Student Affairs*
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N. Allison Haltom, A.B., *Secretary of the University*
William H. Willimon, M.Div., S.T.D., *Dean of the Chapel*

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R. C. "Bucky" Waters, B.S., M.A., *Vice-Chancellor for Medical Center Development*
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Mary T. Champagne, Ph.D., R.N., *Dean, School of Nursing*

SCHOOL OF NURSING ADMINISTRATION

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Barbara S. Turner, D.N.Sc., R.N., *Associate Dean and Director of Nursing Research*
Donna W. Hewitt, M.N., R.N., *Director of Continuing Education*
Mary Louise Icenhour, Ph.D., R.N., *Director of Off-Campus Courses*
Linda C. Snead, *Executive Assistant*
Hugh L. Fulcher, Jr., B.A., M.Div., *Admissions Officer*

SCHOOL OF NURSING FACULTY

Dorothy J. Brundage, Ph.D., Walden, 1980, *Associate Professor*
Mary T. Champagne, Ph.D., Texas at Austin, 1981, *Dean*
Donna S. Havens, Ph.D., Maryland, 1990, *Assistant Professor*
Mary H. Hawthorne, Ph.D., Adelphi, 1989, *Assistant Professor*
Donna W. Hewitt, M.N., South Carolina, 1972, *Assistant Clinical Professor and Director, Continuing Education*
Joanne V. Hickey, Ph.D., Texas at Austin, 1987, *Assistant Professor*
Mary Louise Icenhour, Ph.D., Minnesota, 1986, *Assistant Professor*
Wendy J. Mahaffey, M.S.N., University of Florida, 1992, *Assistant Clinical Professor*
A. Sue McIntire, Ed.D., North Carolina State, 1985, *Associate Professor*
Jeri M. Oehler, Ph.D., Duke, 1985, *Associate Professor*
Ruth M. Ouimette, M.S.N., Yale, 1975, *Assistant Clinical Professor*
Barbara S. Turner, D.N.Sc., California, San Francisco, 1984, *Associate Dean and Director of Nursing Research*
Sandra L. Venegoni, Ph.D., Medical College of Virginia, 1991, *Assistant Clinical Professor*
Sharon Wallsten, Ph.D., North Carolina State, 1987, *Assistant Clinical Professor*

CLINICAL FACULTY

Administration of Nursing Service

Clinical Professor: Patricia O'Connor, Ph.D., R.N., *Executive Director of Nursing Services*. Clinical and Consulting Associates: Terry Ainsworth, M.S.N., R.N.; Sylvia Alston, M.S.N., R.N.; Mary Baldwin, M.P.H., R.N.; Martha Dawson, M.S.N., R.N.; Linda Ellington, M.S.N., R.N.; Doris Esslinger, M.S.N., C.N.A.A., R.N.; Patti Fralix, M.S.N., R.N.; Betty Goolsby, M.S.N., R.N.; Peggy Harewood, M.S., R.N.; Norma Harris, M.S.N., R.N.; Berit Jason, M.S.N., R.N.; Colonel Joyce Jolly, M.S.N., R.N.; Nancy Manning,

M.S., R.N.; Elaine Martin-Hylwa, M.S.N., R.N.; Susan McLean, M.S.N., R.N.; Major Eileen Munn, M.S.N., R.N.; Brenda Nevidjon, M.S.N., R.N.; Marie Robeson, M. A., R.N.; Valinda Rowe-Rutledge, M.S.N., R.N.; Mindy Schramm-Beard, M.S.N., R.N.; Linda Wallace, M. Ed., R.N.; Ruth Wallace, M. N., R.N.; Evelyn Wicker, M.P.H., R.N.; David Williams, M.S.N., R.N.; Jimmie R. Williams, M.S.N., Ed.D., R.N.; Sonja Wilson, Ed.D., R.N.; Francie Wolgin, M.S.N., R.N. ; Nursing Practice Instructor: Martha Cress, B.S.N., R.N.

Adult: Critical Care, Cardiovascular, Trauma Nursing, Acute and Chronic Illness

Clinical and Consulting Associates: Cheryl Batchelor, M.S.N., R.N.; Alyson Breisch, M.S.N., R.N.; Syvil Burke, M.S.N., R.N.; Jane Castle, M.S.N., R.N.; Debra Eckart, M.S.N., R.N.; Mary Elizabeth Hixon, M.S.N., R.N.; Donna Naydich, M.S.N., R.N.; Margaret Priddy, M.S.N., R.N.; Lois Pradka, M.S.N., R.N.; Billie Ross, M.S.N., R.N.; Yvonne Spurney, M.S.N., R.N.; Rita Weber, M.S.N., R.N.; Myra Whiteside, M.S.N., R.N.; Christine Willis, M.S.N., R.N.; Nursing Practice Instructors: Helen Cook, M.S.N., R.N.; Margaret Newman, M.S.N., R.N.

Pediatrics

Clinical and Consulting Associates: Rosalind Bryant, M.S.N., P.N.P., R.N.; Ellen Hart, M.S.N., R.N.; Janice Krueger, M.S.N., R.N.; Marie H. McCulloh, M.S.N., R.N.; Susanne Meghdadpour, P.N.P., M.S.N., R.N.; Louise Minnich, M.S.N., R.N.; Jeane Newmaker, M.S.N., R.N.; Janet Nicollerat, M.S.N., CS, R.N.; Pamela Steele, M.S.N., CNA, R.N.C.; Elizabeth Stewart, M.S.N., R.N.; Nursing Practice Instructor: Michael Alton, M.S.N., R.N.

Oncology and Transplant Nursing

Clinical and Consulting Associates: Mary Lou Affronti, M.S.N., R.N.; Susan Avent, M.S.N., R.N.; Mary Ann Crouch, M.S.N., R.N.; Angela Brown Ellington, M.S.N., R.N.; Margaret Faircloth, M.P.H., R.N.; Linda E. Hood, M.S.N., R.N.; Gail Jens, M.S.N., R.N.; Cindy Lawrence, M.S.N., R.N.; Faye McNaull, M.P.H., R.N.; Kevin Sowers, M.S.N., R.N.; Julie Tart, M.S.N., R.N.; Gwendolyn Waddell, M.S.N., R.N.; Stephanie Yates, M.S.N., R.N.; Nursing Practice Instructors: Elizabeth Abernathy, M.S.N., R.N.; Judy Ross, M.S.N., R.N.; Linda Bright, M.S.N., R.N.

Gerontology

Clinical Assistant Professors: Elizabeth Clipp, Ph.D., R.N.; Eleanor McConnell, M.S.N., R.N.; Clinical and Consulting Associates: Sylvia Brooks, M.S.N., F.N.P., R.N.; Margaret Bye, Ed.D., R.N.; Ellen Davis, M.S.N., R.N.; Hettie Garland, M.S.N., R.N.; Martha L. Henderson, M.S.N., D. Min., R.N.; Dana Hickman, M.S.N., R.N.; Nan Rideout, M.S., M.P.H.; Carol Saur, M.S.N., R.N.; Teepa Snow, M.S., O.T.R./L., F.A.O.T.A.; Paula Sumner, M.S.N., F.N.P., R.N.; Linda Vanhook, M.S.N., A.N.P., R.N.; Donald Wallace, M.D., F.A.A.C.P.; Janette Warsaw, M.S.N., R.N.C.; Margaret J. Wilkman, M.S.N., F.N.P., R.N.

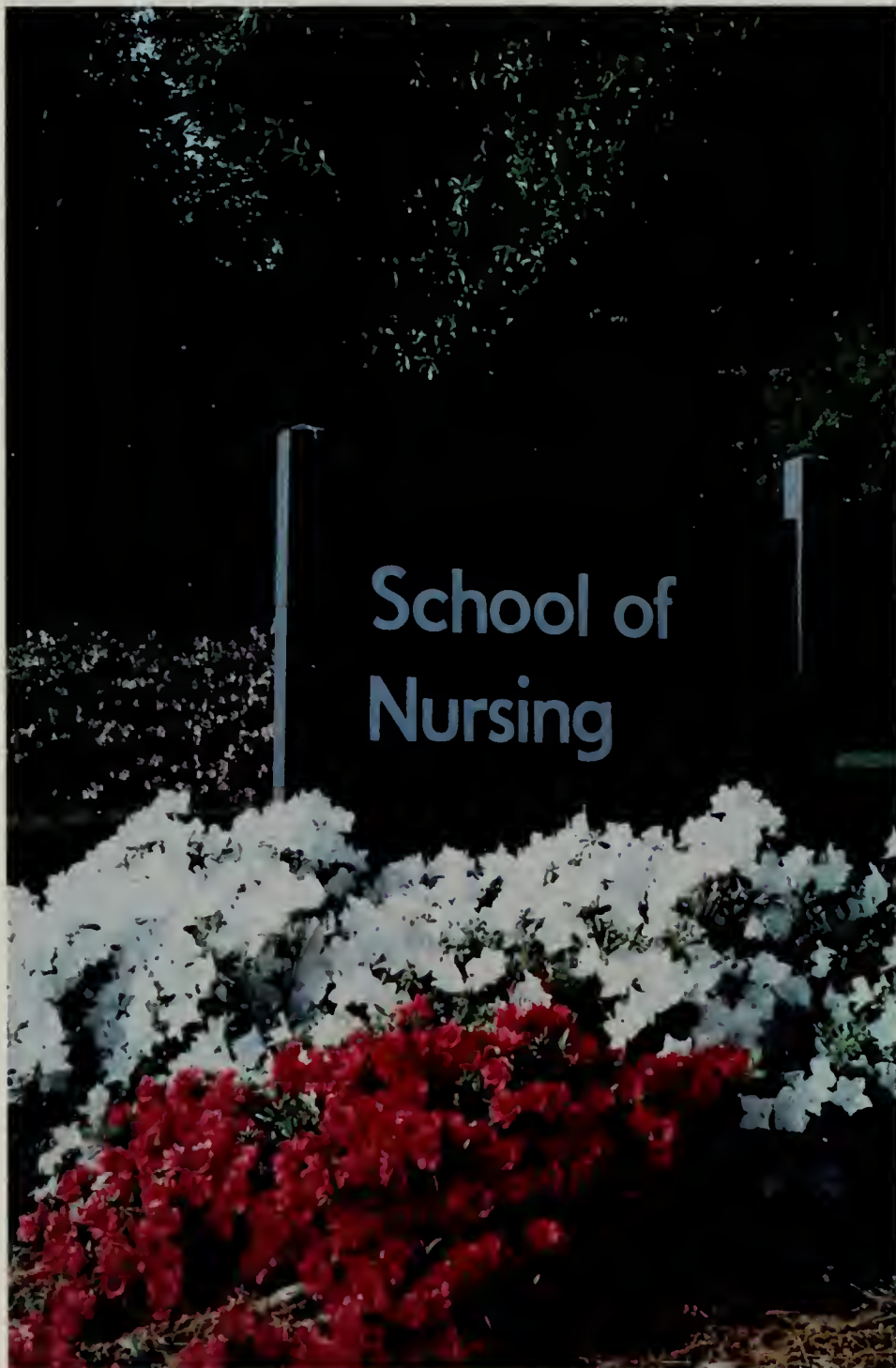
Nursing Service Education

Clinical and Consulting Associates: Marilyn Agney, M.S.N., R.N.; Julia Aucoin, M.S.N., R.N.; Jennifer Borton, M.S.N., R.N.; Pamela Edwards, Ed.D., R.N.



Our goal at the Duke University School of Nursing is to provide leadership in the health care of people. Since the foundation of the school in 1931, Duke has prepared outstanding clinicians, educators, and researchers. We are continuing that tradition. Drawing on the unparalleled intellectual and clinical resources of both Duke University Medical Center and Duke University, we offer a Master of Science in Nursing that balances education, practice, and research. Faculty work closely with students to challenge and nurture them; students not only practice with state-of-the-art science and technology in a great medical center, they also have opportunities to work in rural and underserved areas. The program prepares nurses with advanced training in the areas of greatest need for tomorrow: at Duke we are developing the nursing leaders for the future.

School of Nursing



The Duke University School of Nursing

The Duke University School of Nursing provides leadership in the health care of people through education, research and health care delivery. We provide advanced and comprehensive education to prepare students for lifetimes of learning and careers as leaders, practitioners or as researchers. In addition, faculty and students conduct research that adds to our understanding of health promotion and illness prevention, human responses to illness, and systems of care that facilitate better patient outcomes; and through their practice faculty and students provide compassionate research-based nursing care. Through such work, Duke faculty, students, and graduates are shaping the future of professional nursing practice.

Programs

THE MASTER OF SCIENCE IN NURSING PROGRAM

The School of Nursing offers a flexible, 39- to 42-credit program leading to the Master of Science in Nursing degree. Graduates are prepared as clinical nurse specialists in critical care, gerontology, oncology or pediatrics; as adult nurse practitioners (with specialization in management of acute and chronic illness or oncology), as gerontological nurse practitioners or pediatric nurse practitioners; and as mid-level nurse administrators. Students pursue their educational endeavors with faculty and clinical/consulting associates who have expertise and research in the student's chosen area of specialization. The curriculum is designed to provide maximum flexibility for full-time or part-time study.



The integration of education, practice and research undergirds the entire curriculum and the behavior of those individuals involved in the educative process. Upon completion of the program, the graduate will be able to:

1. synthesize concepts and theories from nursing and related disciplines to form the basis for advanced practice,
2. demonstrate expertise in a defined area of advanced practice,
3. utilize the process of scientific inquiry to validate and refine knowledge relevant to nursing,
4. demonstrate leadership and management strategies for advanced practice,
5. demonstrate proficiency in the use and management of advanced technology related to patient care and support systems,
6. analyze socio-cultural, ethical, economic, and political issues that influence patient outcomes, and
7. demonstrate the ability to engage in collegial intra- and inter-disciplinary relationships in the conduct of advanced practice.

A student may choose to major in one of the following areas: 1. administration of nursing systems; 2. adult nurse practitioner (with an acute and chronic illness or oncology focus); 3. critical care (clinical nurse specialist); 4. oncology (clinical nurse specialist); 5. gerontology (nurse practitioner or clinical nurse specialist); and 6. pediatrics (nurse practitioner or clinical nurse specialist).

THE POST-MASTER'S CERTIFICATE PROGRAM

The School of Nursing offers a post-master's certificate to students who already have an earned MSN and are seeking specialized knowledge within a major offered in the school's master's program. The number of credits required to complete the certificate program varies by major; the student must successfully complete the required courses in the chosen nursing major. Completion of the certificate program will be documented in the student's academic transcript. Depending upon the major, the student may then meet the qualifications for advanced practice certification in the specialty area. For example, students who complete the post-master's certificate in the nurse practitioner majors are eligible to sit for certification examinations.

General Information



Duke University

In 1839 a group of citizens from Randolph and adjacent counties in North Carolina assembled in a log schoolhouse to organize support for a local academy founded a few months earlier by Brantley York. Prompted, they said, by “no small share of philanthropy and patriotism,” they espoused their belief that “ignorance and error are the banes not only of religious but also civil society which rear up an almost impregnable wall between man and happiness.” The Union Institute, which they then founded, was reorganized in 1851 as Normal College to train teachers and eight years later as Trinity College, a liberal arts college. Trinity College later moved to Durham and, with the establishment of the James B. Duke Indenture of Trust in 1924, became Duke University. An original statement of the Board of Trustees of Trinity College concerning the establishment of Duke University provided clear direction about the size and purpose of the university. This statement was as follows: “This University in all its departments will be concerned about excellence rather than size; it will aim at quality rather than numbers—quality of those who teach and quality of those who learn. . . .” This belief continues to guide admission decisions for students and employment practices for faculty.

From academy to university, some of the basic principles have remained constant. The Duke University motto, *Eruditio et Religio*, reflects a fundamental faith in the union of knowledge and religion, the advancement of learning, the defense of scholarship, the love of freedom and truth, a spirit of tolerance, and a rendering of the greatest service to the individual, the state, and the nation. Through changing generations of students, the objective has been to encourage individuals to achieve, to the extent of their capacities, an understanding and appreciation of the world in which they live, their relationship to it, their opportunities and their responsibilities.

Today, Duke University has over 9,000 students, of whom 3,000 are enrolled in the graduate and professional programs. These students represent nearly every state and many foreign countries; Duke has more than 60,000 alumni in all fifty states and in many foreign countries.

Established in 1930 in association with the School of Medicine and Duke Hospital, the School of Nursing joins the Schools of Medicine, Law, Engineering, Divinity, Business, and Environment in preparing qualified individuals for professional leadership and developing excellence in education for the professions.

Duke University Medical Center. The bequests of James Buchanan Duke provided for the opening, in 1930, of the School of Medicine, School of Nursing, and Duke Hospital, which today are the core institutions of the Duke University Medical Center. By opening the first major outpatient clinics in the region in 1930, Duke recognized its responsibility to provide quality care to the people of the Carolinas.

Building on this heritage, the Duke University Medical Center ranks among the outstanding health care centers of the world. The opening of Duke Hospital North in 1980 makes the Duke Hospital, with 1,048 beds, one of the most modern patient care facilities available anywhere. The combined strengths of its teaching, research, and hospital and outpatient care programs represent the continuing fulfillment of the dream of James Buchanan Duke.

Today, the Medical Center at Duke University occupies approximately 140 acres on the West Campus. The goal of the Medical Center is to be a leader in contemporary health care. This involves maintaining superiority in its four primary functions: unexcelled patient care, dedication to educational programs, national and international distinction in the quality of research, and service to the region.

The Duke School of Nursing. The School of Nursing first admitted students to a three-year diploma program in 1931. In 1938, the school began awarding baccalaureate degrees to students who completed two years of college along with the nursing curricula. In 1953, a four-year professional program in nursing leading to the bachelor of nursing degree was established, and in 1958, a graduate program to prepare clinical nurse specialists began. This master's program, which prepared advanced practitioners for clinical practice, was the forerunner of graduate nursing programs nationally.

Today, the School of Nursing offers graduate education for nurses seeking the master of science degree or the post-master's certificate in a variety of majors, including adult health, gerontology, nursing administration, oncology, and pediatrics. Nurse practitioner programs are offered in all four clinical areas. The school is fully accredited by the National League for Nursing. Through educational programs, research, and service, the School of Nursing is dedicated to improving access to care, providing high quality cost-effective care, and preparing leaders for today and tomorrow.

Educational Resources

The Duke University School of Nursing is located on the West Campus between Duke Hospital North and Duke Hospital South and is easily accessible to and from all other university facilities. Students are provided with modern classrooms and labs and well equipped audio-visual and computer centers.

The Duke Nursing Research Center. The goal of the Nursing Research Center is to facilitate the conduct of clinical research by students, faculty and nursing staff. The center provides support for research through assistance with literature searches, development of research designs, Institutional Review Board and/or the protection of human subjects consultation, data collection and data management, grant proposal development, and editorial review. In addition to individual consultation, short courses or workshops are offered. A comfortable conference room is available for research meetings by teams of scholars. This room houses a small collection of research texts and journals for reference as well as a computer with on-line databases for literature searches.

The Duke Nursing Computer Laboratory. The computer laboratory, located in the School of Nursing, is equipped with fifteen state-of-the-art computer work-stations and laser and dot-matrix printers, all connected to a local area network (LAN). Students have



access to the most widely used, up-to-date computer applications in word processing, graphics, spread sheet, database, and statistical entry and analysis. The lab is available to students twenty-four hours a day. Technical assistance is provided to students by faculty and staff with computer expertise.

Duke Centers. Nationally recognized centers include the Duke Heart Center, the Center for Aging and Human Development, the Comprehensive Cancer Center, the Comprehensive Sickle Cell Center, Alzheimer's Disease Research Center, Duke Hypertension Center, Duke-VA Center for Cerebrovascular Research, Geriatric Research, Education, and Clinical Center, Cystic Fibrosis/Chest Center and Clinic, Sleep Disorders Center, and the Eye Center.

Women's Studies. The women's studies program is a multidisciplinary forum for the study of women's roles and gender differences in various societies, past and present. Established in 1982, it offers courses, lectures, films, programs, and research support and brings together faculty and students from all fields who are concerned with both the theoretical questions stemming from the study of gender as well as the implications of such investigations for women and men in contemporary societies. The program offers certificates, as well as a variety of other opportunities. Students in the School of Nursing have the opportunity to pursue a graduate certificate in women's studies.

Neighboring Universities. Through a reciprocal agreement, Duke students may supplement their education in nursing by taking courses in related fields at the University of North Carolina in Chapel Hill, North Carolina State University in Raleigh, and North Carolina Central University in Durham. Graduate students of Duke University and the University of North Carolina at Chapel Hill are granted library loan privileges in both universities.

Libraries

The libraries of the university consist of the William R. Perkins Library and its seven branches on campus: Biology-Forestry, Chemistry, Divinity, Lilly (East Campus), Engineering, Music, Mathematics-Physics; the Pearse Memorial Library at the Duke Marine Laboratory in Beaufort; and the independently administered libraries of Law, Business (Fuqua), and the Medical Center. As of April 1992, these libraries contained over 4 million volumes. The collection includes 9.5 million manuscripts, and over 2 million public documents.

The Medical Center Library. Located in the Seeley G. Mudd Communications Center and Library Building, the Medical Center Library provides services and collections necessary to support educational, research, and clinical activities. Services are available to Medical Center employees, students, faculty, and staff, including the School of Nursing, the School of Medicine, the Division of Allied Health, Duke Hospital, and the graduate departments in the basic health sciences. The library has sizable holdings of nursing books and journals, as well as audio-visual materials. Indexes available include the International Nursing Index, the Cumulative Index to Nursing and Allied Health Literature, and the Nursing Studies Index. MEDLINE, CINAHL, and many other databases are available through computer searches. Additional materials from major medical center libraries are available through interlibrary loans. The uniform borrowing privileges apply to all registered users. Details of loan and other services may be found in the guide published yearly and available at the library.

Clinical Facilities

Duke Hospital. Duke Hospital, one of the largest private hospitals in the south, is part of the Medical Center and currently is licensed for 1,048 beds. The hospital directs its efforts toward the three goals of expert patient care, professional education, and service to the community. It offers patients modern comprehensive diagnostic and treatment facilities and special acute care and intensive nursing units for seriously ill patients. More than 34,000 patients are admitted annually. Ambulatory services include the outpatient clinics, private diagnostic clinics, the employee health service, and the emergency department, with annual total patient visits of over 473,000. The clinical faculty of the Duke University School of Nursing participate in graduate nursing education and practice nursing in the hospital and in the ambulatory settings.

Veterans Affairs Medical Center. The Durham Area Veterans Affairs Medical Center, with 435 beds, annually admits over 7,000 patients. Through recent renovations, the medical center has state-of-the-art intensive care units and an extended care research center. The hospital is within walking distance from the School of Nursing.

Lenox Baker Children's Hospital. On November 1, 1987, the Lenox Baker Children's Hospital became a part of Duke University Medical Center, entering a new phase in its development as an orthopaedic and rehabilitation center for the children of North Carolina. A full spectrum of orthopaedic and rehabilitation services is offered to identify and meet realistic goals; and to educate, support, and assist families, schools, and communities in providing a rich environment for disabled children.

Durham Regional Hospital. Durham Regional Hospital is a county-owned, 476-bed general, short-term care community facility serving the residents of Durham County. This institution participates in many nursing and health-related educational experiences.

Other Hospitals and Clinical Facilities. Various cooperative teaching and clinical arrangements are available to students at other clinical facilities in both urban and rural settings. These hospitals include Moore Regional Hospital, Columbus County Hospital, Dorothea Dix Hospital, Cape Fear Valley Medical Center, John Umstead Hospital, Womack Army Medical Center, Raleigh Community Hospital, Rex Hospital, Carteret General Hospital, Southeastern General Hospital, and Central Carolina Hospital. Long-term care facilities include Carolina Meadows, The Greenery Rehabilitation Center, and Saint Joseph's of the Pines. Ambulatory clinics and health departments include Uwharrie Family Health Care, Stovall and Oxford Family Practice, Foscoe Family Health Center, East Chatham and Goldston Health Center, Lincoln Community Health Center, Southeast Permanente Medical Group of North Carolina, PA, Cumberland County Health Department, and Scotland County Health Department.

Special Clinical Arrangements. Depending on the student's experience and interest, in accordance with course objectives, special arrangements can be made with other clinical facilities and agencies.

Admission and Progression



Admission and Progression

ADMISSION REQUIREMENTS FOR THE MASTER'S DEGREE

1. Bachelor's degree with an upper division nursing major from a program accredited by the National League for Nursing. The bachelor's or post-bachelor's course work must include satisfactory completion of a course in descriptive and inferential statistics.
2. Minimum of one year's experience in an area relevant to the projected course of study for all specialties.
3. Undergraduate grade point average of 3.0 on a 4.0 scale.
4. Satisfactory performance on the Graduate Record Examination (GRE) or Miller Analogies Test (MAT).
5. Eligibility to be licensed as a professional nurse in North Carolina.*
6. Documentation of the acquisition of physical assessment knowledge and skills, for those applicants choosing a clinical specialty.
7. Three references attesting to personal and professional qualifications. At least two references must be from former employers, faculty members, or deans.
8. Personal interview. Other arrangements may be considered when distance is a factor.

Selection will be based on the applicant's qualifications, intellectual curiosity, potential for professional growth, and contributions to the profession. Exception to any of the admission requirements will be considered on an individual basis.

*Candidates for admission to the Duke University School of Nursing must obtain a license to practice in the state of North Carolina before matriculation. Offers of admission to the School of Nursing cannot be considered final until matriculants present proof of licensure to the Office of Admissions no later than the end of the first day of class during the semester of matriculation.

Students enrolled in the Graduate School of Nursing must maintain a current North Carolina license and are required to show proof of licensure, or status of renewal of license, to the admissions officer on a yearly basis (January).

Information on licensure procedures for the state of North Carolina may be obtained from the North Carolina Board of Nursing, P. O. Box 2129, Raleigh, North Carolina 27602, or by calling 919-782-3211 or 919-733-5356.

ADMISSION REQUIREMENTS FOR THE POST-MASTER'S CERTIFICATE OPTION

1. Completion of application for certificate program including undergraduate and graduate transcripts. The bachelor's or post-bachelor's course work must include satisfactory completion of a course in descriptive and inferential statistics.
2. Minimum of one year's experience in an area relevant to the projected course of study for all specialties.
3. A master's degree from an NLN accredited school of nursing.
4. Licensure or eligibility for licensure as a registered nurse in North Carolina.
5. Documentation of the acquisition of physical assessment knowledge and skills, for those applicants choosing a clinical specialty.
6. Two letters of academic and/or professional reference.
7. Interview with a faculty member in the specialty area.

ADDITIONAL ADMISSION REQUIREMENTS FOR INTERNATIONAL APPLICANTS

International students provide a unique cultural and personal addition to Duke. They are encouraged to apply early in the academic year prior to the year they wish to attend Duke to ensure time to complete the following additional requirements:

1. evidence of adequate financial support for the duration of the program;
2. a minimum score of 550 on the Test of English as a Foreign Language (TOEFL) if English is not the primary language;
3. a passing score on the Commission on Graduates of Foreign Nursing Schools (CGFNS) examination.

The Commission on Graduates of Foreign Nursing Schools (CGFNS) examination is a prerequisite for taking the Registered Nurse Licensing examination in the state of North Carolina and for obtaining a nonimmigrant occupational preference visa (H1-A) from the United States Immigration and Naturalization Service. CGFNS offers a two-part certification program that includes a credentials review, followed by a test of nursing and English language skills. The CGFNS examination is given in March, August, and November. Application materials may be requested from CGFNS, 3624 Market Street, Philadelphia, Pennsylvania 19014 (215-349-8767). For further information, contact the School of Nursing admissions officer.

ADMISSION PROCEDURE

An applicant to the Duke University School of Nursing Graduate Program must obtain an application form from the School of Nursing admissions office. A check or money order for the nonrefundable processing fee of \$50 must accompany each application. In addition, the applicant should provide the following supporting documents:

1. two copies of the official transcript from each college or university attended, to be sent directly to the admissions office of the School of Nursing;
2. two supplementary transcripts showing completion of work that was in progress when the earlier transcripts were obtained, if necessary;
3. three letters of recommendation (*on forms provided by the School of Nursing*) by persons qualified to judge the applicant as a prospective graduate student, to be mailed directly to the admissions office (at least two must be from current or former employers, faculty members, or deans); and,

4. for master's degree applicants, scores from the Graduate Record Examination (GRE) or Miller Analogies Test (MAT) that are not more than five years old.

Testing dates and locations for the Graduate Record Examination can be obtained from most colleges or from the Educational Testing Service, P. O. Box 6000, Princeton, New Jersey 08541-6000 (609-771-7670 or 510-654-1200). Information for the Miller Analogies Test can be obtained from the Psychological Corporation, 555 Academic Court, San Antonio, Texas 78204-3956 (210-921-8801). Information also may be obtained from Duke University's Office of Counseling and Psychological Services (CAPS) (919-660-1000). The number to use on the GRE to indicate that you want a copy of your scores sent to the School of Nursing is R5173. The number to use on the MAT is 2734.

Once all of the above information is received by the admissions office, a faculty member will contact the applicant and arrange a personal interview.

CONSIDERATION OF APPLICATION

The application will be considered when all forms have been received by the School of Nursing Office of Admissions. Complete applications to the Duke University School of Nursing Graduate Program must be submitted by the following dates:

March 1 (for early admission fall semester);

March 1 (summer term), June 1 (regular fall semester), or November 1 (spring semester).

It is the responsibility of the applicant to ensure that the admissions office of the School of Nursing receives all required materials before the deadline.

Notification of Status. Admission may be approved, deferred, or rejected. If admission is approved, the applicant will receive a letter of admission and acceptance forms. The process of admission is not complete until the acceptance forms and nonrefundable tuition deposit of \$100 have been received by the admissions office of the School of Nursing. This fee will be credited toward tuition. Once the acceptance forms and tuition-deposit fee have been received, applicants needing financial assistance will be contacted by letter by the financial aid officer of the School of Nursing concerning their eligibility for financial aid. Applicants whose admission is deferred or rejected will be notified by letter.

Health and Immunization Record. North Carolina law requires all new students to present proof of certain immunizations before matriculation. The Duke University Student Health Immunization Form and Report of Medical History, furnished by Duke University, should be completed and returned to the Director of Student Health Services, Box 2899 DUMC, Duke University, Durham, North Carolina 27710 (919-684-3367).

It is preferable for students to arrive on campus with complete, verified immunization forms. For those who are unable to do so, the Durham County Health Department (560-7600) on Main Street provides some of the necessary inoculations free of charge. On-campus inoculations are available through Student Health Services (684-3367). A special immunization clinic is held during the days when new students arrive on campus, with a nominal charge for on-campus immunizations.

FULL-TIME AND PART-TIME DEGREE STATUS

Opportunities for part-time and full-time study are available. Full-time status is defined as taking a minimum of nine (9) credits per semester, excluding summer session when fewer credits may be taken. Students who wish to change from full-time or part-time status must request permission from the dean.

NONDEGREE STUDENTS

Individuals may take graduate level courses as a nondegree student, provided they have a bachelor of science in nursing degree from a National League for Nursing accredited school. Nondegree students are admitted to individual classes by permission of the instructor on a space available basis. To apply, an official copy of all undergraduate

nursing transcripts must be sent to the School of Nursing Office of Admissions along with a completed Application for Admission as a Nondegree Student and a \$50 application fee. Students who register for clinical courses also must submit two letters of reference from their employer and evidence of licensure as a nurse in the state of North Carolina.

All nondegree application requirements must be received by the deadline for the semester during which the course will be offered (cf. "Consideration of Application" in this book). Requests for nondegree status will be considered within two weeks after the appropriate deadline. If permission is granted by the faculty, the student will be notified by the Office of Admissions. (Nondegree students requesting a second course make the request to the Office of Admissions of the School of Nursing.) Up to seven credits earned as a nondegree student are accepted for credit towards the MSN degree if the applicant is later admitted to the master's program.

TRANSFER OF GRADUATE CREDITS

A maximum of six units of graduate credit may be transferred for graduate courses completed at other accredited institutions (or in other graduate programs at Duke). Transfer credit will be given only for academic work completed within five years before matriculation at Duke. Such units are transferable only if the student has received a grade of *B* (3.0 or its equivalent) and after the student has earned a minimum of 6 units of graduate credit at Duke University School of Nursing. A student wishing to transfer course work should make a written request, and provide a syllabus or some other description of the course to his/her academic advisor.

TRANSFER TO ANOTHER GRADUATE NURSING MAJOR

A change of graduate nursing major may be made, contingent upon approval of the faculty involved. Should a change be made, a student must meet all requirements of the new major.

TIME FOR COMPLETION OF THE MASTER'S DEGREE

The master's degree student should complete all requirements for the degree within five calendar years from the date of initial matriculation. No full-time residence is required; however, all students enrolled in the school who have not been granted a leave of absence by the dean must register each fall, spring, and summer until all degree requirements are completed.

ADVISEMENT

An interim academic advisor for each student is assigned on admission to the program. After consultation with the interim and proposed advisors, students select their permanent advisor according to their clinical and research interests in the area of study. This advisor assists the student in planning and implementing his/her course of study throughout the master's program.

GRADES

All courses counting toward the master's degree must be taken for the following grades: *A* (4.0); *A-* (3.7); *B+* (3.3); *B* (3.0); *B-* (2.7); *C+* (2.3); *C* (2.0).

Graduate students must attain a *B* grade in each course in the graduate nursing major. No more than six units of *C* can be applied toward graduation. An *F* (0.0) in any graduate level course will result in administrative withdrawal from the program at the end of the semester in which the grade is received.

In case of illness or other nonacademic problems, it is the student's responsibility to negotiate with the professor for an *I* (incomplete grade). In the case of an *I*, the professor issuing the *I* will specify the date by which the student is to remove the deficiency; in no case will this be more than one calendar year from the date the course ended.



WITHDRAWAL FROM A COURSE

Students may make changes in their schedule during the two week drop/add period at the beginning of the fall and spring semesters and during the first three days of the summer semester. A fee is charged by the university if changes are made after that period. The signatures of the advisor and the dean are necessary to drop or add courses. If a course is dropped after the drop-add period, the status of the student at the time of withdrawal from the course will be indicated on the record as *Withdrew Passing (WP)* or *Withdrew Failing (WF)*.

INTERRUPTION OF PROGRAM AND WITHDRAWAL FROM THE GRADUATE PROGRAM

The School of Nursing reserves the right, and matriculation by the student is a concession of this right, to request the withdrawal of any student whose performance at any time is not satisfactory to the School of Nursing. If a student for any reason wishes to withdraw from the school, notification should be made to the dean before the expected date of withdrawal. Students who have withdrawn from the program must apply for readmission according to regular admission policies.

Students who find it necessary to interrupt their program of study should request in writing a leave of absence addressed to the dean of the School of Nursing. A maximum of one calendar year's leave may be granted; this will be counted toward the total time allowed to complete the program.

COMMENCEMENT

Graduation exercises are held once a year, in May, when degrees are conferred and diplomas issued to students who have completed all requirements. Students who complete degree requirements by the end of the fall or by the end of the summer term receive diplomas dated December 30 or September 1, respectively. There is a delay in the mailing of September and December diplomas because diplomas cannot be issued until they are approved by the Academic Council and Board of Trustees. All graduates, including those receiving degrees in December and September, are expected to attend graduation exercises in May.

Master's Degree



Requirements for the Master's Degree

Each of the school's majors requires the completion of 39 or 42 units of credit. These units include core courses required of all master's students, the research option (either the thesis, a research project, or a course in research utilization), courses in the major, and electives. Each major requires the student to complete a clinical residency.

Required Core Courses*	Credits
N301. Foundations of Advanced Nursing Practice	3
N302. Informatics	2
N303. Issues in Contemporary Health Care Organizations	3
N307. Research Methods	2
N308. Applied Statistics	<u>2</u>
Total	12

Research Options (Select One)*	Credits
N312. Research Utilization	3
N313. Thesis	6
N314. Nonthesis Research Project	<u>6</u>
Total	3-6

Major Fields of Study

ADMINISTRATION OF NURSING SYSTEMS

The major in Administration of Nursing Systems focuses on changes in the health care delivery system, models of nursing care delivery, financial management and patient outcomes. The total minimum number of credits required for graduation is 39. Course work in the major includes the following:

	Credits
N340. Administration of Nursing Systems I	3
N344. Administration of Nursing Systems II	3
N348. Budget Planning and Financial Management	3
N345. Nursing Administration Residency	3-9
Electives/Independent Study	<u>3-12</u>
Total	21-24

*Required of all MSN candidates.

NURSE PRACTITIONER MAJORS

The nurse practitioner majors focus on the knowledge and skills necessary to provide primary care across settings, including care of individuals in rural and underserved areas. The total minimum number of credits required for graduation is 42. Course work in the major includes 18 credit units of practitioner core courses and 9 additional credits including the residency in the major.

Practitioner Core Courses (Required for all NP students)	Credits
N352. Diagnostic Reasoning and Physical Assessment	4
N353. Theoretical Bases for Management of Care	3
N354. Managing Common Acute and Chronic Health Problems I	4
N355. Managing Common Acute and Chronic Health Problems II	4
N356. Clinical Pharmacology and Interventions	<u>3</u>
Total	18

NURSE PRACTITIONER OPTIONS

Adult Nurse Practitioner–Acute and Chronic Illness Management Major	Credits
N321. Foundations of Advanced Acute/Critical Care Nursing Practice I	3
N323. Foundations of Advanced Acute/Critical Care Nursing Practice II	3
N326. Nurse Practitioner Residency: Acute and Chronic Illness Management	<u>3</u>
Total	9

Adult Nurse Practitioner–Oncology Major	Credits
N330. Oncology Nursing I: Epidemiology and Pathophysiology	3
N332. Oncology Nursing II: Symptom and Problem Management	3
N335. Nurse Practitioner Residency: Oncology	<u>3</u>
Total	9

Gerontological Nurse Practitioner	Credits
N370. Social Issues, Health, and Illness in the Aged Years	3
N376. Managing Care of the Frail Elderly	3
N375. Nurse Practitioner Residency: Gerontology	<u>3</u>
Total	9

Pediatric Nurse Practitioner	Credits
N384. Advanced Concepts in Development in Pediatric Nursing Practice	3
N385. Advanced Nursing Care of Children with Major Illnesses	3
N386. Nurse Practitioner Residency: Pediatrics	<u>3</u>
Total	9

CLINICAL NURSE SPECIALIST MAJORS

The clinical nurse specialist majors focus on the knowledge and skills necessary to provide care to patients with complex health problems and their families, in a variety of settings. The total minimum number of credits required for graduation is 39. Course

work in the majors includes 10 credit units in the clinical nurse specialist core courses and 9 to 14 credit units in the major. Elective credits are used to support the major.

Clinical Nurse Specialist Core Courses

(Required for all CNS students)

	Credits
N352. Diagnostic Reasoning and Physical Assessment	4
N353. Theoretical Bases for Management of Care	3
N356. Clinical Pharmacology and Interventions	<u>3</u>
Total	10

CLINICAL NURSE SPECIALIST OPTIONS

CNS—Critical Care Major

	Credits
N321. Foundations of Advanced Acute/Critical Care Nursing Practice I	3
N323. Foundations of Advanced Acute/Critical Care Nursing Practice II	3
N325. CNS Practicum—Acute/Critical Care Nursing Electives/Independent Study	<u>3</u> 2-5
Total	11-14

CNS—Gerontology Major

	Credits
N370. Social Issues, Health, and Illness in the Aged Years	3
N354. Managing Common Acute and Chronic Health Problems I	4
N355. Managing Common Acute and Chronic Health Problems II	4
N376. Managing Care of the Frail Elderly	<u>3</u>
Total	14

CNS—Oncology Major

	Credits
N330. Oncology Nursing I: Epidemiology and Pathophysiology	3
N332. Oncology Nursing II: Symptom and Problem Management	3
N334. Clinical Nurse Specialist Residency: Oncology Electives/Independent Study	<u>3</u> 2-5
Total	11-14

CNS—Pediatrics Major

	Credits
N384. Advanced Concepts in Development in Pediatric Nursing Practice	3
N385. Advanced Nursing Care of Children with Major Illnesses	3
N383. CNS Practicum: Pediatrics Electives/Independent Study	<u>3</u> 2-5
Total	11-14

Course of Study for the Post-Master's Certificate

The purpose of the post-master's certificate program is to provide opportunities for students who already have an earned MSN to gain specialized knowledge within a major provided at Duke University School of Nursing. The post-MSN certificate represents the student's successful completion of the required courses in the chosen nursing major. Course requirements for the post-MSN certificate are listed below by major.

NURSING ADMINISTRATION

	Credits
N340. Administration of Nursing Systems I	3
N344. Administration of Nursing Systems II	3
N345. Nursing Administration Residency	3-9
N348. Financial Planning and Budget Analysis	<u>3</u>
Total	12-18

ACUTE/CRITICAL AND CHRONIC ILLNESS MANAGEMENT

Clinical Nurse Specialist	Credits
N321. Foundations of Acute/Critical Care Nursing I	3
N323. Foundations of Acute/Critical Care Nursing II	3
N352. Physical Assessment and Diagnostic Reasoning	4
N353. Theoretical Bases for Management of Care	3
N356. Clinical Pharmacology and Interventions	3
N325. CNS Practicum: Acute/Critical Care	<u>3</u>
Total	19

Nurse Practitioner	Credits
N352. Physical Assessment and Diagnostic Reasoning	4
N353. Theoretical Bases for Management of Care	3
N354. Common Acute and Chronic Health Problems I	4
N355. Common Acute and Chronic Health Problems II	4
N356. Clinical Pharmacology and Interventions	3
N326. NP Residency: Acute and Chronic Illness Management	<u>3</u>
Total	21

N321. Foundations of Advanced Acute/Critical Care Nursing Practice I	3
N323. Foundations of Advanced Acute/Critical Care Nursing Practice II	<u>3</u>
Total	27*

GERONTOLOGICAL NURSING

Clinical Nurse Specialist	Credits
N352. Physical Assessment and Diagnostic Reasoning	4
N353. Theoretical Bases for Management of Care	3
N354. Common Acute and Chronic Health Problems I	4
N355. Common Acute and Chronic Health Problems II	4
N356. Clinical Pharmacology and Interventions	3
N370. Social Issues, Health and Illness in the Aged Years	3
N376. Managing Care of the Frail Elderly	3
N3xx. Health Care Needs and Delivery of Care to Underserved Populations (<i>Optional</i>)	<u>3</u>
Total	24 (27)

*If a candidate has an MSN with a clinical major but desires the NP post-master's certificate in a different area, or if the candidate has an MSN in administration, the two clinical courses (6 credits) in the new area will also be required.



Nurse Practitioner

	Credits
N352. Physical Assessment and Diagnostic Reasoning	4
N353. Theoretical Bases for Management of Care	3
N354. Common Acute and Chronic Health Problems I	4
N355. Common Acute and Chronic Health Problems II	4
N356. Clinical Pharmacology and Interventions	3
N370. Social Issues, Health and Illness in the Aged Years	3
N376. Managing Care of the Frail Elderly	3
N3xx. Health Care Needs and Delivery of Care to Underserved Populations (<i>Optional</i>)	3
N375. GNP Clinical Residency	3
Total	27 (30)

ONCOLOGY NURSING

Clinical Nurse Specialist

	Credits
N352. Physical Assessment and Diagnostic Reasoning	4
N353. Theoretical Bases for Management of Care	3
N356. Clinical Pharmacology and Interventions	3
N330. Oncology Nursing I: Epidemiology and Pathophysiology	3
N332. Oncology Nursing II: Symptom and Problem Management	3
N334. Clinical Nurse Specialist Residency: Oncology	3
Total	19

Nurse Practitioner	Credits
N352. Physical Assessment and Diagnostic Reasoning	4
N353. Theoretical Bases for Management of Care	3
N354. Common Acute and Chronic Health Problems I	4
N355. Common Acute and Chronic Health Problems II	4
N356. Clinical Pharmacology and Interventions	3
N335. Nurse Practitioner Residency: Oncology	3
Total	<u>21</u>
N330. Oncology Nursing I: Epidemiology and Pathophysiology	3
N332. Oncology Nursing II: Symptom and Problem Management	3
Total	<u>27*</u>

PEDIATRIC NURSING

Clinical Nurse Specialist	Credits
N352. Physical Assessment and Diagnostic Reasoning	4
N353. Theoretical Bases for Management of Care	3
N356. Clinical Pharmacology and Interventions	3
N384. Advanced Concepts in Development in Pediatric Nursing Practice	3
N385. Advanced Nursing Care of Children with Major Illnesses	3
N383. CNS Practicum: Pediatrics	3
Total	<u>19</u>

Nurse Practitioner	Credits
N352. Physical Assessment and Diagnostic Reasoning	4
N353. Theoretical Bases for Management of Care	3
N354. Common Acute and Chronic Health Problems I	4
N355. Common Acute and Chronic Health Problems II	4
N356. Clinical Pharmacology and Interventions	3
N386. Nurse Practitioner Residency: Pediatrics	3
Total	<u>21</u>

N384. Advanced Concepts in Development in Pediatric Nursing Practice	3
N385. Advanced Nursing Care of Children with Major Illnesses	3
Total	<u>27*</u>

*If a candidate has an MSN with a clinical major but desires the NP post-master's certificate in a different area, or if the candidate has an MSN in administration, the two clinical courses (6 credits) in the new area will also be required.



Courses of Instruction



Courses of Instruction*

301. Theoretical Foundations of Advanced Nursing Practice. This course is designed to explore the theoretical bases for development of the advanced practice nurse and advanced practice. The focus will be the application of theoretical and conceptual frameworks to guide decision making for culturally diverse populations with a variety of problems to achieve desired outcomes. A variety of developmental, systems, psychodynamic, physiological, and nursing theories and conceptualizations relevant to health and illness care will be presented. 3 units. Fall. *Hickey and Brundage*

302. Nursing Informatics. An introduction to computer technology in the health care arena with a focus on selected computer applications commonly used in the management of health care information. The automation of data management and its impact on nursing administration, education, practice and research are addressed in the context of information systems and nursing informatics. 2 units. Fall. *Hewitt*

303. Issues in Contemporary Health Care Organizations. Survey of key concepts that form the bases for understanding health care institutions and the environment in which they exist. Current issues affecting health care institutions within the context of the financial and political systems will be analyzed in relation to their impact on advanced nursing practice. Steps to prepare the advanced practice nurse to negotiate an independent contract will be introduced. 3 units. Fall. *Icenhour*

307. Research Methods. Focuses on research methods needed for systematic investigation and expansion of nursing knowledge. How to critically read research and develop a research proposal also will be studied. 2 units. Fall. *Champagne and Turner*

*Course offerings and content subject to change.

308. Applied Statistics. Emphasizes the application and interpretation of statistical procedures used in health care and nursing research. Data management and the relationship between research design and statistical techniques also will be studied. Prerequisite: Nursing 307 or consent of the instructor. 2 units. Spring. *Champagne and Hawthorne*

312. Research Utilization in Advanced Nursing Practice. The focus of this course is upon methods of implementing research findings to solve identified clinical problems. Students will obtain skill in developing research-based protocols and in using research methods to evaluate nursing care. Prerequisites: Nursing 307 and 308, or consent of the instructor. 3 units. Summer. *Champagne and Hawthorne*

313. Thesis. 1-6 units. Fall, spring, summer. *Staff*

314. Non-Thesis Option. 1-6 units. Fall, spring, summer. *Staff*

316. Scientific Writing. This course provides a review of the principles and practice of scientific writing, with emphasis on research proposals, theses, other scientific papers and articles for publication. Students are expected to complete a proposal for a thesis or a non-thesis option, an article or other scientific work as part of the course. 3 units. Fall. *Staff*

321. Foundations of Advanced Acute/Critical Care Nursing Practice I. Provides information underpinning patient responses to common critical illnesses approached through an integration of physiological, family and organizational systems theory. Course content includes pathophysiologic concepts and theory necessary for skilled advanced nursing practice (assessing, monitoring, selecting, teaching and coaching) for patients and their families in acute and/or critical care settings. This course focuses on patients with cardiopulmonary, hemodynamic, and electrolyte problems. Prerequisite: Nursing 352. 3 units. Spring. *Hawthorne*

323. Foundations of Advanced Acute/Critical Care Nursing Practice II. Provides information underpinning patient responses to common critical illnesses approached through an integration of physiological, family and organizational systems theory. Course content includes pathophysiologic concepts and theory necessary for skilled advanced nursing practice (assessing, monitoring, selecting, teaching and coaching) for patients and their families in acute and/or critical care settings. This course focuses on patients with neurological, renal, hepatic, and gastrointestinal problems and also trauma, multi-organ system failure, and immunosuppression. Prerequisites: Nursing 321 and 352. 3 units. Summer. *Brundage*

325. Clinical Nurse Specialist Practicum: Acute/Critical Care Nursing. Provides the student with supervised practice as a clinical nurse specialist. Emphasis is upon the development of the domains and competencies of clinical nurse specialty practice within acute care settings. Students specialize in nursing care of selected patient populations. Prerequisites: Nursing 321, 323, 352, 353, and 356. 3 units. Fall, spring, summer. *Brundage, Hawthorne, and Hickey*

326. Nurse Practitioner Residency: Acute and Chronic Illness Management. Provides the student with supervised practice as a nurse practitioner. Emphasis is upon the development of the domains and competencies of nurse practitioner practice in both acute and primary care settings. Activities also emphasize the management of major acute and chronic illnesses. Prerequisites: Nursing 321, 323, 352, 353, 354, 355, and 356. 3 units. Fall, spring, summer. *Brundage, Hawthorne, and Hickey*

330. Oncology Nursing I: Epidemiology and Pathophysiology. Focus is on the epidemiology, pathophysiology and bio-behavioral aspects of cancer across the adult years. Major topics include cancer physiology, prevention, detection, role of defenses, treatment, and responses to cancer. 3 units. Spring. *McIntire*

332. Oncology Nursing II: Symptom and Problem Management. The ONS Guidelines for Oncology Nursing Practice serve as the framework for examination of potential problems and symptom management in cancer patients. Topics include knowledge deficit, information, coping, comfort, nutrition, protective mechanisms, mobility, elimination, sexuality, ventilation, circulation, and managed care. Case management and case studies are used in seminars. Prerequisite: Nursing 330. 3 units. Summer. *McIntire*

334. Clinical Nurse Specialist Residency: Oncology. A clinical practicum in which students specialize in their interest areas, choosing among ambulatory/clinic care, inpatient care, bone marrow transplant care, community/preventive care, home care, hospice care and care of persons with HIV and AIDS. Case management, care maps, case studies and ONS Guidelines for Oncology Nursing Practice serve as formats for the practicum and seminars. Prerequisites: Nursing 330, 332, 352, 353, and 356. 3 units. Fall, spring, summer. *McIntire*

335. Nurse Practitioner Residency: Oncology. A clinical residency in which students specialize in the domains and competencies of the adult practitioner in oncology nursing. The areas include managing patient illness in ambulatory and acute inpatient settings, monitoring quality care, organizational and role competencies, healing and teaching roles. Prerequisites: Nursing 330, 332, 352, 353, 354, 355, and 356. 3 units. Fall, spring, summer. *McIntire*

340. Administration of Nursing Systems I. Focuses on the theoretical bases for developing and maintaining nursing systems in health care/health related institutions. Development of management skill serves as the basis for further inquiry and development of the nurse administrator role. Problem solving methodology is used to develop strategies for dealing with issues from the internal and external environment of health care institutions. 3 units. Fall. *Havens*

344. Administration of Nursing Systems II. Focuses on the theoretical bases of leadership in facilitating the development of professional nursing practice. Development, maintenance, and supervision of nursing systems in health care/health related institutions are discussed. Regulation and legal tenets from the external environment and their impact on the administration of nursing systems are emphasized. Prerequisite: Nursing 340. 3 units. Spring. *Icenhour*

345. Nursing Administration Residency. The residency builds upon the student's prior knowledge and experience in nursing administration. The intent is to develop independent problem solving skills while under the guidance and mentorship of a practicing nurse administrator. The minimum required units are three with a maximum of nine units for those needing additional learning experiences with a preceptor. Prerequisites: Nursing 340 and 344. 3-9 units. Summer. *Havens and Icenhour*

348. Budget Planning and Financial Management. Designed for managers in complex organizations. Focuses on the knowledge and skills needed by the nurse manager to plan, monitor, and evaluate budget and fiscal affairs for a defined unit or clinical division. Health care economics, personnel, and patient activities are analyzed from a budgetary and financial management perspective within an environment of regulations and market competition. Prerequisite: Nursing 303 suggested. 3 units. Spring. *TBA*

352. Diagnostic Reasoning and Physical Assessment in Advanced Nursing Practice. Combines lecture and laboratory experiences to develop advanced skills in assessment of physical, cognitive, nutritional and functional domains. Nurse-patient interaction, data collection, and diagnostic reasoning are emphasized. 4 units. Fall. *Ouimette, Mahaffey, and Venegoni*

353. Theoretical Bases for Management of Care in Advanced Nursing Practice.

The course is designed to give the student a broad view of models for holistic management of care across settings and illness trajectories and to analyze the role of the advanced practice nurse in providing care to culturally diverse patients and families. Collaboration, coordination for continuity of care, and innovation to address cost, quality, and access are stressed. Models for monitoring and evaluating total quality assurance and standards of practice are developed to insure cost-effective and quality care that matches patient needs. 3 units. Summer. *Hickey*

354. Managing Common Acute and Chronic Health Problems I.

The course emphasizes assisting patients to reach or maintain their highest level of health and functioning. The focus will be on health promotion, health maintenance and primary care management of respiratory, cardiac, gastrointestinal and mental health problems encountered by patients and their families. Common acute and chronic illnesses are emphasized, with recognition of situations requiring interdisciplinary collaboration or referral. The pharmacological management of common problems is systematically integrated into the course. Clinical practicums are in a variety of settings depending upon the students' clinical major. Practice settings include rural health clinics, home, hospital units (both in- and out-patient units), and long term care facilities. Advanced practice role development is incorporated into the course through care management seminars and supervised clinical practice. Prerequisites: Nursing 352, Prerequisite/Concurrent: Nursing 356. 4 units. Spring. *Ouimette, Mahaffey, and Venegoni*

355. Managing Common Acute and Chronic Health Problems II.

The course emphasizes assisting patients to reach or maintain their highest level of health and functioning. The focus will be on health promotion, health maintenance, and primary care management of common skin disorders, arthritic, neurologic, gynecologic, anemia and endocrine problems encountered by patients and their families. Common acute and chronic illnesses are emphasized, with recognition of situations requiring interdisciplinary collaboration or referral. The pharmacological management of common problems is systematically integrated into the course. Clinical practicums are in a variety of settings depending upon the students' clinical major. Practice settings include rural health clinics, home, hospital units (both in- and out-patient units), and long term care facilities. Advanced practice role development is incorporated into the course through care management seminars and supervised clinical practice. Prerequisites: Nursing 352 and 356. 4 units. Summer. *Ouimette, Mahaffey, and Venegoni*

356. Clinical Pharmacology and Interventions for Advanced Nursing Practice.

The course is a combination of lecture and case analyses designed to increase assessment and management skills of the nurse practitioner related to pharmacological management of patients with a variety of common acute and chronic health problems. Data collection and diagnostic reasoning are emphasized in relation to drug selection, patient/family education, monitoring, and evaluation of pharmacological interventions. 3 units. Spring. *Brundage and Kessler*

360. Concepts of Teaching and Learning.

Focuses on the key concepts and principles that form the bases for the teaching and learning process. Educational theories of teaching and learning, situations and issues serve as the framework for developing instructional strategies used in advanced nursing practice roles. 3 units. Spring or summer. *McIntire*

362. Ethics in Nursing.

Focuses on the historical development of ethics in nursing, analysis of moral language, codes of ethics, frameworks for ethical decision-making with case analysis, and strategies for discussion of ethics in nursing. 3 units. Spring or summer. *Castle*

370. Social Issues, Health, and Illness in the Aged Years. Examines diversity in development and adaptation to environmental, social, psychological, and biological changes. Theories of aging, health and aging, intimacy and sexuality, rural-urban health care patterns, minority health care patterns, demographic trends, and death, dying, and loss are discussed. 3 units. Spring. *Wallsten*

375. Nurse Practitioner Residency: Gerontology. The residency provides GNP students with concentrated clinical opportunities. Emphasis is on clinical decision making, practice issues and organizational management. Residency sites and associated preceptors are arranged by faculty. Prerequisites: Nursing 352, 353, 354, 355, 356, 370, and 376. 3 units. Fall, spring, summer. *Ouimette and Wallsten*

376. Managing Care of the Frail Elderly. Emphasizes assessment, rehabilitation, and management of complex problems of elders who reside in community and institutional settings. Research projects and innovative care strategies are explored. Organizational and managerial effectiveness and consultative roles of the GNP/GCNS are examined. Prerequisites: Nursing 352, 353, 354, 355, and 356. 3 units. Fall. *Ouimette and Wallsten*

383. Clinical Nurse Specialist Practicum: Pediatrics. Supervised clinical practicum exploring the role of the clinical nurse specialist in a pediatric setting of the student's choice. Prerequisites: Nursing 352, 353, 356, 384, and 385. 3 units. Fall, spring, summer. *Oehler*

384. Advanced Concepts in Development in Pediatric Nursing Practice. Focuses on the importance of developmental issues in the advanced practice of pediatric nursing. Normal cognitive, motoric, social/emotional and language development and the usual developmental challenges of each age group are addressed in the context of health maintenance and management of illness. Prerequisite: Nursing 352. 3 units. Spring. *Oehler*

385. Advanced Nursing Care of Children. This course addresses societal and family issues that affect the maintenance of health in children and complex care management by the advanced practitioner. Prerequisites: Nursing 352 and 384. 3 units. Summer. *Oehler*

386. Nurse Practitioner Residency: Pediatrics. Supervised clinical practice in an approved setting that allows the opportunity for practice as a pediatric nurse practitioner. Prerequisites: Nursing 352, 353, 354, 355, 356, 384, and 385. 3 units. Fall, spring, summer. *Oehler and Mahaffey*

399. Selected Topics or Independent Study. Students select a topic of professional interest within the specialty area or in support of the specialty area, to be studied with a faculty member. Specific objectives, evaluation method, and other requirements are determined prior to registering for the course of study. Prerequisite: Matriculation into Nursing Curriculum. 1-3 units. Fall, spring, summer. *Staff*

Financial Aid



Financial Aid

In today's economy, many students find it necessary to work while attending graduate school. At the Duke University School of Nursing, we do all we can to make this as convenient as possible. Class scheduling allows the part-time student to attend two courses a semester. Courses typically meet once a week with most courses meeting on either Tuesday, Wednesday, or Thursday.

Students who need financial assistance to enroll in the School of Nursing are encouraged to apply. The procedures to follow are outlined below, as are the major assistance programs.

Application. A prospective student who desires to be considered for financial aid (traineeships, scholarships, or loans) should indicate this on the application form for admission. Financial aid information and appropriate forms will be forwarded to the prospective student after the acceptance letter and the \$100 tuition deposit are received by the School of Nursing Office of Admissions. Decisions regarding financial aid awards are made in writing to the student.

Student Budget. The student budget, established as a basis for assistance, includes tuition based on full-time enrollment for the twelve-month period, required fees and insurance, lodging, food, and modest personal expenses. If a student is enrolled for part-time study, the budget is prorated.

Adjustments to Aid Award. At any time after the financial aid application has been submitted, or an award made, adjustments may be made by the school if a student's estimated resources cease to exist or fail to materialize. Similarly, if a student receives funds that were not anticipated at the time of the application, the financial aid award will be reduced accordingly.

Duke Educational Assistance and Nursing Services Tuition Reimbursement. After one year of employment, the Duke University Tuition Assistance Program becomes available. This provides 50 percent tuition assistance during the second year of employment and 90 percent from the beginning of the third year on.

For students who have become Duke University Nursing Service employees, there are added benefits. After an initial probationary period, the Duke nurse becomes eligible for the first step of the Nursing Service Tuition Reimbursement Program. At the end of the semester, a tuition receipt, transcript of the grade, and simple one-page form are all that is necessary for full reimbursement of the cost of tuition (two course maximum spring and/or fall term, one course maximum summer session). When the student does not qualify for university tuition assistance, the Nursing Service program pays 100 percent. When the university pays 50 percent, the Nursing Service program reimburses for the remaining 50 percent; when the university provides for 90 percent, Nursing Service reimburses the remaining 10 percent. In other words, except for various small fees, books and taxes, the cost of education is minimal. Not only does the nurse gain valuable experience in one of the most respected health care institutions in the world, but the Duke University Tuition Assistance Program and the Nursing Service Tuition Reimbursement Program combine to make a Duke education one of the most affordable available.

Duke University and the Department of Nursing Service at Duke University Medical Center provide this opportunity as part of a commitment to excellence in advanced nursing preparation. For more information, call the Office of Admissions of the School of Nursing at 919-684-4248 and/or the Office of Nurse Recruitment at Duke University Medical Center at 919-684-6339.

Scholarships

Need-based scholarships are available to nursing students meeting the criteria for such scholarships. Merit scholarships are available to outstanding students only.

Allen Family Nursing Scholarship. This endowed scholarship fund was given to the School by Mr. and Mrs. Fred Allen in honor of their daughter-in-law, Mrs. James H. Allen (Ruth Register), a 1958 graduate of the Duke University School of Nursing. This scholarship provides assistance to worthy students based on merit as well as financial need.

Ann Henshaw Gardiner Scholarship. This scholarship was established by bequest of Miss Gardiner, who was the first full-time faculty member of the Duke University School of Nursing. Scholarships are awarded to students based on scholastic achievement and financial need.

William Randolph Hearst Nursing Scholarship. The annual income from this scholarship provides merit scholarships for students enrolled in the oncology nursing program.

The Anna L. Hoyns Memorial Scholarship. The endowment for this scholarship was given to the school by Lucille H. Sherman, Forest Hills Gardens, New York, in memory of her mother, Anna L. Hoyns, to be awarded to deserving students.

Marla Vreeland Jordan Scholarship Fund. This fund was established in 1993 under the will of Ervin R. Vreeland in memory of his daughter, Marla, who graduated in 1960 with a BSN degree.

Helga and Ery W. Kehaya Nursing Scholarship. The endowment for this scholarship was given to the school by Helga and Ery W. Kehaya of Tequesta, Florida, in appreciation for the excellent nursing care provided at Duke University Medical Center. Awards are made to worthy students.

School of Nursing Loyalty Scholarship. The alumni of the Duke University School of Nursing established this fund in recognition of the school's outstanding program. Awards are made to worthy students based on need.

Margaret Castleberry and William Frank Malone Scholarship. This endowed scholarship was established by Colonel William Frank Malone as a memorial to his wife, Margaret

Castleberry Malone, a Duke University School of Nursing alumna, to provide assistance to students in the graduate nursing program, giving consideration to the greatest need.

Marian Sanford Sealy Scholarship. This fund was established as a memorial to Mrs. Sealy by the Durham-Orange County Medical Auxiliary of Durham, North Carolina. Mrs. Sealy was a student at the Duke University School of Nursing from October 1936 to September 1939. She was a staff nurse in Duke Hospital and the wife of Dr. Will C. Sealy, Professor of Thoracic Surgery at Duke University Medical Center. Awards are made to students based on merit.

School of Nursing Student Aid Scholarship. This fund was established to provide scholarships to students based on need.

Teagle Nursing Scholarship. This scholarship was established by The Teagle Foundation, Inc. to support students pursuing the master's degree in administration of nursing services.

Emmy Lou Tompkins Scholarship. This fund was established by Emmy Lou Morton Tompkins (Duke University Class of 1936) in appreciation of the education received by her daughter, Boydie C. Girimont, who graduated from the Duke University School of Nursing in 1962. Scholarship awards are based on scholastic achievement.

Lettie Pate Whitehead Foundation Scholarship. This fund was established by Conkey Pate Whitehead as a memorial to his mother. Awards are made for the aid and benefit of female students from nine southeastern states—Georgia, North Carolina, South Carolina, Virginia, Louisiana, Mississippi, Alabama, Tennessee, and Florida.

Florence K. Wilson Scholarship. This endowed scholarship was established by the Duke University School of Nursing Alumni in memory of their third dean. Awards are made to worthy students based on need.

Traineeships

The school annually submits an application for traineeship support to the U. S. Department of Health and Human Services, Health Resources, and Services Administration. If approved and funded, traineeship awards are made to students according to the grant guidelines.

Loans

Students who are legal residents of North Carolina and out-of-state students in eligible institutions of higher education in North Carolina who are accepted for enrollment or enrolled and maintaining satisfactory progress may apply for a loan through the School of Nursing (see the business office of the School of Nursing for more information) or from the *College Foundation, Inc. (CFI)*. The types of loans available from CFI are:

Federal Stafford Loans (Subsidized and Unsubsidized). The student must complete and file the Graduate and Professional School Financial Aid Service (GAPSFAS) application.

Federal Supplemental Loans for Students (SLS). The student does *not* have to demonstrate "need" for these loans.

Federal PLUS Loans to Parents. The parent does *not* have to demonstrate need but must not have an adverse credit history and must be able to show the ability to make the required monthly payments.

For more information, contact the business office of the School of Nursing at 919-684-3786.

Tuition and Fees



Tuition and Fees*

Tuition for the Duke University School of Nursing Graduate Program is currently \$445.90 per unit, effective fall semester 1993; it increases by 10 percent every third year. Part-time tuition is calculated at the same rate. Each full-time student is required to register for a minimum of nine (9) units per semester. Part-time students may register for one to eight units per semester.

Tuition and fees are due and payable at the times specified by the university for that semester and are subject to change without notice. A late registration fee of \$25 is charged for failure to complete registration during the official registration period.

Application Fee. A nonrefundable fee of \$50 must accompany the application for admission.

Tuition Deposit. A nonrefundable deposit of \$100 must accompany the acceptance of admission. Upon enrollment, the \$100 will be credited toward tuition.

Parking Fee. Each student parking a motor vehicle on campus must register it at the beginning of the fall semester in the traffic/parking office at Parking Garage II. A student who acquires a motor vehicle and parks it on campus after academic registration must register it within five calendar days after operation on the campus begins. Students are required to pay an annual parking fee. Students registering a vehicle after January 1 pay a prorated fee.

At the time of registration of a motor vehicle, the state vehicle registration certificate, a valid driver's license, and a student identification card must be presented.

*Subject to change.

Transcript Fee. All matriculants in the master's program pay a one-time transcript fee of \$30. Certificate students and nondegree students pay a one-time \$15 fee. Nondegree students who later become matriculants in the master's program must then pay an additional \$15 fee so that their total fee is \$30. This fee permits all students and alumni to receive official university transcripts to meet their legitimate needs without additional charge, except for special handling such as express mail.

The Student Health Fee. All full-time students and part-time degree candidates (except those registered *in absentia*) are assessed a fee for the Student Health Service unless proof of coverage is made available to the business officer of the School of Nursing at the time of matriculation and a waiver is granted. For the fall and spring, the fee is \$336 (\$168 each semester). For the summer, the fee is \$108.

Graduate and Professional Student Council Fee. A \$5.00 fee, paid in fall and spring semesters, provides full year membership.

Thesis Fee. The binding fee for three (required) university copies of a thesis is \$25. Additional copies are \$7.50 each. A charge of \$5 per copy is assessed for each copy of the thesis that is mailed to a student upon request.

Audit Fee. Courses may be audited on a space available basis with the consent of the instructor. Audit fees are \$160 per course. Students registered full time during fall and spring may audit courses without charge. For more information, students should consult the School of Nursing Office of Admissions.

Computer Lab Fee. A \$15 per semester fee, payable to the School of Nursing, is assessed for use of the Computer Lab. Upon payment of the fee, the student is given a key to the lab, which is open seven days a week. The fee is to be paid directly to the School of Nursing Business Office.

Clinical Lab Fee. A \$100 fee is assessed for N352, Diagnostic Reasoning and Physical Assessment. This fee is used to cover the expenses of standardized patients, patients for the gynecological exam, and patients for the final examination for the course. The fee is to be paid directly to the School of Nursing Business Office (Room 1010) at the beginning of classes.

Payment of Accounts. New students are required to pay tuition and fees at the time of matriculation. Following first enrollment in the Graduate Program in Nursing, monthly invoices are sent to each student by the bursar's office. As part of the acceptance of admission to Duke University, the student agrees to pay all invoices upon receipt. A late payment charge is assessed for all charges not paid in full by the due date. That fee is assessed at the rate of 1.25 percent per month applied to the past due balance. A student in default on tuition or fee charges will not be allowed to register for subsequent classes, receive a transcript of academic records, have academic credits certified, be granted a leave of absence, or receive a diploma at graduation. In addition, the student may be subject to withdrawal from school.

Refunds. For students who withdraw from school or are withdrawn by the university during fall and spring semesters, refunds of tuition and fees are governed by the following policy:

1. In the event of death, tuition and fees will be fully refunded.
2. In all other cases of withdrawal from the university, students may elect to have tuition refunded or carried forward as a credit for later study according to the following schedule:
 - a. withdrawal before classes start: full refund;
 - b. withdrawal during the first or second week of classes: 80 percent refund (*the student health fee will not be refunded*);

- c. withdrawal during the third, fourth, or fifth week of classes: 60 percent refund (*the student health fee will not be refunded*);
 - d. withdrawal during the sixth week: 20 percent refund (*the student health fee will not be refunded*);
 - e. withdrawal after six weeks: no refund.
 - f. Tuition charges paid from grants, scholarships, or loans will be restored to those funds on the same *pro rata* basis and will not be refunded or carried forward.
3. If a student changes his or her status from full to part-time, has to drop a course for which no alternative registration is available, drops special fee courses, or drops an audit during the first two weeks of the drop/add period, a full refund may be granted with the approval of the dean. (*The student health fee is nonrefundable.*)

Students not attending a summer term or course(s) for which they have registered, must follow the correct procedure and drop the course(s) prior to the beginning of class, even if they have not paid tuition and fees. Failure to drop the course(s) will result in administrative withdrawal from the summer term at the end of the first three days of the term, and the student will be billed for 20 percent of the tuition plus the health fee (if paid by the student). If tuition and fees have been paid for the summer term, the following refund policies apply:

- 1. When applications to withdraw from a term or drop a course are received before the first class day of a given term, full tuition and fees will be refunded.
- 2. When applications to withdraw from a term or drop a course are received during the first three class days of a given term, 80 percent of the tuition will be refunded. There is no charge for drops and adds that result in no change in tuition. The health fee will not be refunded.
- 3. When applications to withdraw from a term or drop a course are received after the third class day, there will be no refund of tuition and fees.

Services Available



Living Accommodations

Duke University's Office of Off-Campus Housing, 919-684-5832, provides information about various residential apartment facilities and housing options in the Durham area. Except for assuring that owners sign a statement of nondiscrimination, off-campus property is in no way verified and neither the university nor its agents negotiate between owners and interested parties. Prospective students are encouraged to visit Durham and inspect possible lodgings to compare options.

Food

Graduate students may dine on campus at any Duke University Food Services (DUFS) facility. DUFS provides cafeterias, restaurants, fast food operations, delis, snack bars, ice cream/dessert shops, and catering services in convenient locations throughout campus.

On West Campus, students may dine in the Blue & White Room (cafeteria), the University Room (cafeteria), the Oak Room (restaurant), the Cambridge Inn (deli, pizza, pastry and dessert shop), Arthur's (snack bar), the Rathskeller (hamburgers, pasta, and Mexican foods), the Boyd-Pishko Cafe (fast foods), and Lick's (ice cream/frozen yogurt). On East Campus, facilities include the East Court Food Mall (a collection of food shops including a grill, oriental food station, salad bar/healthy food shop, Mexican food area, deli, pizza station, and a dessert/ice cream shop), and the East Court Cafeteria. North and Central Campus food service locations include Trent Drive Cafeteria, the North/Central Connection (snack bar), and The Pub on Central Campus (specialty sandwiches, salads, and beverages).

Food purchases may be paid in one of three ways: by cash, a dining account, or a flexible spending account. Both the dining account and the flexible spending account allow a student to make purchases on campus by accessing a prepaid account carried on the student identification card, or Duke Card. Information about Duke Card accounts



is available from the Duke Card Office, 024 West Union Building, Durham, North Carolina 27706, 919-684-5800.

Further information about campus food service facilities and dining plan options is available from Duke University Food Services, 029 West Union Building, Durham, North Carolina 27706, 919-684-3621.

Student Health Program

The Duke Student Health Program is administered by the Department of Community and Family Medicine, Duke University Medical Center. Health services are provided by board-certified family physician faculty, physician assistants, and nurse-practitioners.

Pickens Health Center (684-6721), located on the corner of Erwin Road and Trent Drive, is the primary location for health care. Students are seen by appointment Monday-Friday, 8:00 A.M.-6:00 P.M., Saturdays from 9:00 A.M.-1:00 P.M., and Sundays from 2:00 P.M.-5:00 P.M. A wide variety of services are available: medical care, GYN clinic, health education, sports medicine, laboratory, pharmacy, travel and immunization, x-rays, cold/flu self-help table, allergy clinic, and nutrition counseling.

Students are encouraged to use the Pickens Health Center as their portal of entry to other health resources when needed, including the specialty clinics at Duke University Medical Center.

For problems arising after hours, students should call the *Infirmery (684-3367)*. After consulting with the physician on call, the nurse may advise the student to come to the Infirmery or to the Duke Emergency Department (684-2413) for further evaluation. In the event of an obvious life-threatening emergency, students should go directly to the

Emergency Department. If necessary, Duke Public Safety (call 911 or 684-2444) will provide on-campus transportation to the Emergency Department or the Infirmary.

The *Infirmary* (684-3367), located on the fourth floor of Duke University Hospital-South Division, Purple Zone, provides inpatient treatment of illnesses too severe to manage in the residence hall or apartment, but not requiring hospitalization.

The *Health Education* component of Student Health is headquartered at Pickens Health Center (684-6721). Health education staff are available, by appointment, to assist students in making informed decisions that promote their health. Topics may include alcohol and other drug usage, eating and nutrition, sexually transmitted diseases, stress management, and others.

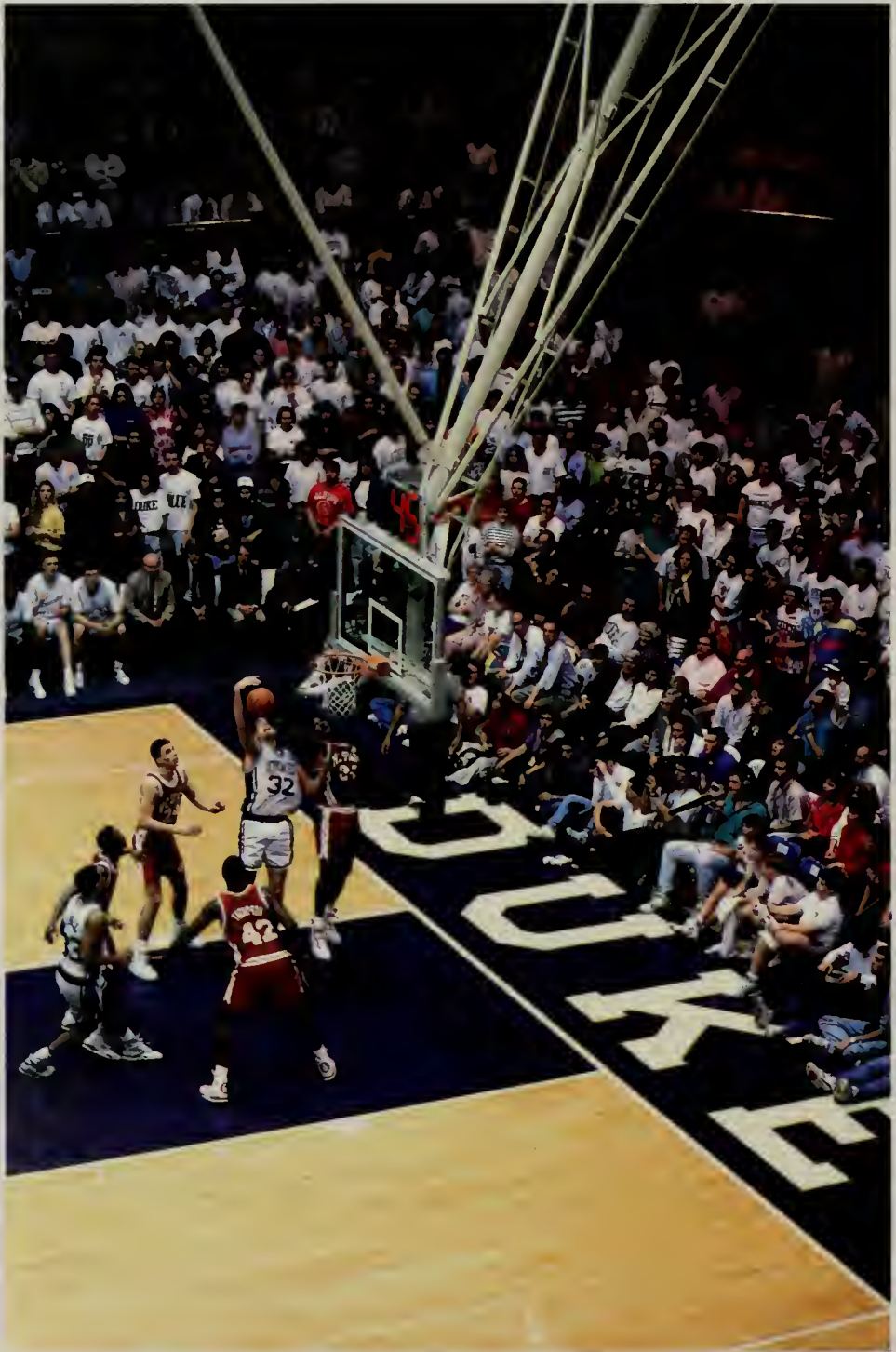
Sports Medicine Services: The Student Sports Clinic is located on West Campus, in the basement of Card Gym. A physical therapist is available from 3:00-7:00 P.M. weekdays, on a walk-in basis, to assess exercise-related problems, and to outline short-term treatment plans to aid recovery and help prevent re-injury. The Sports Medicine Clinic is located on the third floor of the Finch-Yeager Building next to Wallace Wade Stadium. Students may be seen there by a Student Health physician, by appointment (684-6721).

Counseling and Psychological Services (CAPS; 660-1000) is a complementary service to the Student Health program. Mental health and career counseling services are available, as detailed in the CAPS brochure.

Confidentiality. Information regarding the physical or mental health of students is confidential, released only with the student's permission.

Upon arrival on campus, all students receive a detailed brochure about the Student Health Program and the services covered by the Student Health Fee.

Student Activities



Student Activities

Graduate and Professional Student Council (GPSC). The Graduate and Professional Student Council is the representative body for the students of graduate departments and professional schools. The council provides a means of communication between schools and between graduate students and the administration. The council selects graduate students for membership on university committees. Representatives of each department and officers of the council are selected annually.

Duke School of Nursing Governance. Students participate in the governance of the School of Nursing through membership in the school's Curriculum Committee, the Recognition, Honors, and Lectureship Committee, and *ad hoc* committees as appropriate.

Sigma Theta Tau. In the spring of 1972 the Beta Epsilon Chapter of Sigma Theta Tau, the International Honor Society of Nursing, was established at Duke with a charter membership of 100 students, faculty, and alumni.

Sigma Theta Tau is the only international honor society for nursing and is a member of the Association of College Honor Societies. The first chapter was established in 1922. The society recognizes achievement of superior quality, fosters high professional standards, encourages creative work, recognizes the development of leadership qualities and strengthens the individual's commitment to the ideals and purposes of professional nursing. Sigma Theta Tau is an educational organization standing for the best in nursing. Duke University School of Nursing students who meet Sigma Theta Tau's criteria are eligible for induction into the Beta Epsilon Chapter.

Alumni Association. Operating from the Alumni House at 614 Chapel Drive, the Duke University General Alumni Association, through its affiliate groups such as local clubs, classes, and school and college alumni associations, links its 72,000 members with the university and one another. The alumni office staff coordinates educational, cultural and social activities; provides avenues for involvement in university affairs; and promotes loyalty and esprit de corps throughout the Duke community. All alumni are automat-

ically members of the association. An active alumnus is one for whom a current mailing address is on file; a contributing member is one who pays annual dues and becomes involved in class, club, and other alumni activities.

The Alumni Association sponsors many university-wide programs and services. Included among these are student programs, off-campus and on-campus gatherings, *Duke Magazine*, recognition and awards programs, and travel and continuing education opportunities.

The Women's Center. The Women's Center, an office serving both women and men, develops activities and programs to address advocacy and support for women's and gender issues. Programming focuses on three specific areas: health, safety, and personal and professional development. The center works in cooperation with other departments, such as the Women's Studies Program and Counseling and Psychological Services, to involve undergraduates, graduate and professional students, and faculty and staff, with primary emphasis on the student population. It also advises diverse students and groups, including sororities and politically oriented groups. Coordinated by a director, in conjunction with an advisory board, the Women's Center is located in the Bryan Center.

The Mary Lou Williams Center for Black Culture. Dedicated in memory of the "great lady of jazz" and former artist-in-residence whose name it bears, the center has established its significance as the gathering place on campus where broadly-based issues of social/cultural relevance are addressed to an increasingly larger cross-section of the Duke community. The center's audience include great numbers of students who are prepared to honor the wonder of African-American history and culture, addressed each year in many programs and events celebrating black possibilities and black successes. Among past programs have been art exhibits by renowned African-American artists, musical events, film series, and a number of lecture-discussions of relevant topics. In addition, the center has expanded its programs to include the Asian, Hispanic, Native American and Indian, all of which evoke new possibilities for multicultural appreciation.

International House. International House is the center of cocurricular programs for close to six hundred students at Duke from seventy-nine countries, as well as for U.S. American students who are interested in other cultures, are considering study abroad, or are planning to travel outside the United States. The International Association, sponsored by International House, plans social and cultural programs which emphasize personal contact and informal exchange of ideas among students from diverse backgrounds. Included are weekly open houses, with lectures, discussions, films, potluck dinners or parties; and periodic trips outside of Durham.

Programs of International House which assist students from abroad in participating in the life of the Duke and Durham communities include an intensive orientation program at the beginning of the academic year; the International Friend/Host Family Program, in which interested international students may become acquainted with U.S. American families or individuals; Duke Partners, in which an international student is paired with a U.S. American partner for weekly meetings to work on language and life skills; Speakers' Bureau, which arranges for international students to speak at civic and social groups as well as schools in the Durham community; and English conversation classes which meet four hours a week on campus.

International House also has a visa specialist on the staff who works with students from abroad in fulfilling the various immigration and tax formalities involved in coming to Duke. Further information may be obtained from International House, 2022 Campus Drive, 919-684-3585.

Cocurricular Activities. Graduate students at Duke University are welcome to use such university recreational facilities as swimming pools, tennis courts, and the golf

course, and to affiliate with the choral, dance, drama, music, and religious groups. They may become junior members of the American Association of University Professors and may affiliate with Phi Beta Kappa and social fraternities.

A full program of cultural, recreational, and religious activities is presented by the Office of Cultural Affairs, the Duke University Campus Ministry, the Duke University Union, the Office of Student Activities, and recreational clubs. The Duke University Union sponsors a wide range of programs through its committees, which are open to all segments of the campus community. Programs include touring Broadway shows, rock, jazz, and pop concerts; speakers; films; a film-making program; the largest fully student-run television station in the country; art exhibits in three galleries; and a broad program in crafts located in Southgate Dormitory and the Bryan University Center. The Aquatic Center and the East Campus Gymnasium pool are available to students, faculty, and staff families. The handball, racquetball, squash, and tennis facilities and the weight room on East and West Campus are also available. Interested students may participate in softball and other team sports.

The University Center complex includes the Bryan University Center, which houses the Information Center, two drama theaters, a film theater, lounges, stores, meeting rooms, games room, the Rathskeller, art gallery, and other facilities; the West Union, which includes dining facilities; and the Flowers Building, which includes student publications, Page Auditorium, and the university box office.

Inquiries should be directed to the Recreation Office, 105 Card Gymnasium; the Office of Cultural Affairs, 109 Page Building; Duke Chapel; the Duke University Union, Bryan University Center; or the Office of Student Activities, Bryan University Center.

Full information regarding the scheduling of major events and programs for the entire year will be found in the Duke University *Yearly Calendar*; detailed and updated information for the fall and spring semesters in the *Duke Dialogue*, available each Friday; updated information for the summer session in the *Summer Session Calendar*, published at the beginning of each summer term; and the *Duke Chronicle*, published each Monday through Friday during the fall and spring and each Thursday during the summer. Copies of the Duke University calendars may be obtained at the information desk, Bryan University Center, or the calendar office, Page Building. The *Summer Session Calendar* is published by the summer session office and is available at convenient locations.

Religious Life. The Duke University Chapel is open from 8:00 A.M. until 10:00 P.M. A variety of worship experiences is available throughout the week including the university service of worship at 11:00 A.M. each Sunday, noonday prayer each weekday during term, and Choral Vespers each Thursday at 5:15 P.M.. The Graduate and Professional Student Fellowship, sponsored by Duke Chapel, provides ecumenical fellowship as well as service opportunities for interested students. Many religious organizations are represented by Duke Campus ministry, which invites graduate students to participate in the various religious life groups. The office of the dean of the Chapel, the assistant dean of the Chapel, or Campus Hillel can provide details concerning religious opportunities on campus and the various religious organizations (including Buddhist; Christian [Eastern Orthodox, Protestant, and Roman Catholic]; Hindu; Jewish; and Muslim) in the Durham area.

Standards of Conduct



Standards of Conduct

Duke University expects and requires of all its students cooperation in developing and maintaining high standards of scholarship and conduct.

Students are expected to meet academic requirements and financial obligations, as specified elsewhere in this bulletin, in order to remain in good standing. Certain nonacademic rules and regulations must be observed also. Failure to meet these requirements may result in dismissal by the appropriate officer of the university.

The university wishes to emphasize its policy that all students are subject to the rules and regulations of the university currently in effect or that, from time to time, are put into effect by the appropriate authorities of the university. Students, in accepting admission, indicate their willingness to subscribe to and be governed by these rules and regulations and acknowledge the right of the university to take such disciplinary action, including suspension and/or expulsion, as may be deemed appropriate for failure to abide by such rules and regulations or for conduct judged unsatisfactory or detrimental to the university. University authorities will take action in accordance with due process.

THE DUKE STUDENT HONOR COMMITMENT

The Honor Commitment is a personal commitment of honor and integrity which is self imposed and not enforced by an outside authority. All graduate students in the School of Nursing pledge to follow the Honor Commitment.

The commitment reads as follows:

A unique aspect of a liberal education is its attempt to instill in the student a sense of honor and high principles that extends beyond academics. An essential feature of Duke University is its commitment to an atmosphere of integrity and ethical conduct. As a student of Duke University, I accept as my personal responsibility the vigorous maintenance of high standards of honesty, truth, fairness, civility, and concern for others.

My devotion to integrity establishes that I will not cheat in academic work and that I will adhere to the established and required community code of conduct. According to the dictates of my own conscience, I will report behavior in violation of such established standards. In addition and beyond the requirements of any code or law, I confirm my own commitment to personal honor and integrity in all matters large and small. Even though the idea of honor is an abstract one, by implementing this ideal, I join the men and women of Duke University in making the concept of honor a reality.



STUDENT DISCRIMINATION GRIEVANCE PROCEDURES

The Duke University policy on nondiscrimination is set forth on the credits page of this bulletin. Procedures for investigation and remedy of any complaint and for appeal of any decision are detailed in the *Bulletin of Duke University: Information and Regulations*.

CONFIDENTIALITY OF STUDENT RECORDS

Duke University adheres to a policy permitting students access to their educational records and certain confidential financial information. Students may request in writing review of any information contained in their educational records and may, using appropriate procedures, challenge the content of these records. An explanation of the complete policy on educational records may be obtained from the registrar's office.

No information, except directory information (see below), contained in any student record is released to persons outside the university or to unauthorized persons on the campus, without the written consent of the student. It is the responsibility of the student to provide the Office of the Registrar and other university offices, as appropriate, with the necessary specific authorization and consent. For students in the School of Nursing, authorization forms are available in the Office of the Dean.

Directory information includes name, addresses, telephone listing, date and place of birth, photograph, major field of study, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees and awards received, and most recent previous educational institution attended. This information may be released to appear in public documents and may otherwise be disclosed without student consent unless a written request not to release this information is filed in the Office of the Registrar by the end of the second week of classes each term.

Bulletin of Duke University
(JPSP 073-680)

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School of Nursing Graduate Program

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